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C.W. Boyce Analyses Paper and Pulp Situation

Executive Secretary of American Paper and Pulp Association Discusses Development and Economic Status of Industry In Series of Three Lectures Before the Staff and Students of the Institute of Paper Chemistry, Appleton, Wis.—Declares Industry Ranks Among First Ten In Country—Pulp Controlling Factor In Price of Paper

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., September 30, 1935—Development of the paper industry in the United States will be largely in the field of pulp manufacture, according to Charles W. Boyce of New York, executive secretary of the American Pulp and Paper Association. He presented an economic analysis in a series of three lectures last week at the Institute of Paper Chemistry, Appleton, Wis.

Pulp is the controlling factor in the price of paper, Mr. Boyce said. The possibility of pulp development is shown in the ratio of local production to imports. When 1,225,000 tons of kraft pulp were manufactured in America, 500,000 tons were imported. At the same time, 800,000 tons of unbleached sulphite were produced, while 900,000 tons were imported. A promising factor is the development of pulp production on the west coast, with a production now aggregating 300,000 tons annually.

The paper and pulp industry, added Mr. Boyce, has $1,250,000,000 invested in plants and equipment; $250,000,000 in timber and similar holdings, and $1,000,000,000 in the conversion of paper into paper products. The industry ranks among the first ten in the country. The annual sales do not equal the investment, and the industry of late has not been profitable.

Paper Machine Capacity

Because paper machines rarely wear out, actual capacity of paper manufacture is invariably above actual production, the speaker explained. One machine has been in use since 1857 and is still in operation. About 22 per cent of present capacity involves machines installed prior to 1900, and 30 per cent involves machines installed prior to 1920. Since 1920, the trend has been towards greater width and speed of machines. The flexibility of the older equipment permits its use for specialties, while the newer machines are designed for long runs and constant speeds.

With the development of ground wood production on new equipment, a shift of other mills to higher grades has occurred. The transition, said Mr. Boyce, is normal and expands the use of paper. There are now 1,000 grades of paper made from three or four different raw materials and four types of machines. Of ninety mills making newsprint in 1910, thirteen have been abandoned, six are still making newsprint, and the remainder are making other grades.

Pointing out the stability of the industry because of its place in the field of necessities, Mr. Boyce said production during the depression was only 25 per cent less than capacity, as compared, for example, to steel production, which was only 15 per cent of capacity.

Price and Regulation

Discussing the matter of price and regulation, Mr. Boyce said there is a price which will give best results for labor and capital when volume is sufficient. That price is an important element in the future of the division of the industry and should be maintained. If it is too high, the consequent increase in production spoils the market.

Liberalization of industrial laws was suggested by the association secretary, who said government sanction rather than government control is preferable. Some of these developments in government sanction may occur in the next session of Congress. Based on the rise and fall of employment and wages before, during and after the depression, the industry has about reached the end of the period when each unit can be a law unto itself. With the advent of codes, the industry undertook to eliminate evil practices, and an educational program stimulating cooperative approach to common problems has been launched.

Production Control

Production control as a means of assisting the industry, declared Mr. Boyce, might be effective with simple grades but would be impossible for the industry as a whole. Stabilization of prices seems more feasible. Summarizing the growth of production, Mr. Boyce said in 1869 there were approximately 2,000 cords of wood used in making paper in America, and in 1933 there were 6,000,000. The location of pulp supplies now is an important factor in the costs of production and the general operation of the industry. Production of paper in the United States increased from about 400,000 tons in 1875 to 11,100,000 tons in 1929, well above the production peak of any other country. Canada, second in paper production, manufactured about 3,000,000 tons.

News of the Industry

Patents for their design of a "knockdown" ice cream container have been awarded to Ronald I. Drake of Apple-

(Continued on page 27)

Canadian Newsprint Outlook More Favorable

Volume of Production for 1935 May Exceed All-Time Record of 1929—Greater Unanimity Among Manufacturers Indicates Slightly Higher Prices for 1936—Schedule of Quotations Tentatively Announced Last Year Generally Favored

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., October 1, 1935—The fact that there is continued betterment in the output of Canadian newsprint is leading to the belief that volume of production for the year 1935 will not only overtake but exceed the all-time record of 1929. For the first eight months of the present year the production was within one per cent of that of the similar period in 1929, the figures being 1,754,742 tons, as compared with 1,766,216 tons, or only 11,474 tons less for the eight months.

The big fly in the ointment is, of course, that this large tonnage is being produced at unremunerative prices, but the general view is that conditions are more favorable now for an advance in prices than they have been at any time since the market collapsed.

Marketing conditions now are relatively stable, consumption of newsprint continues to rise steadily, and while there is still a possibility of "the cat jumping out of the bag," to use a common phrase, there is much evidence of a greater unanimity among manufacturers.

The fact that despite offers of substantial tonnage requirements, no manufacturer has been induced to depart from the ranks by accepting contracts for 1936 at the present price level is looked upon as highly encouraging.

Moderate Advance in Price Expected

The belief is that a moderate advance in prices for 1936 will be agreed upon—a price that will permit a small profit to the producers and which at the same time can be met by the publishers without undue embarrassment.

The schedule which was tentatively announced last year, but which fell through because one producer broke from the ranks, is favored. That was for an advance of $2.50 per ton for the first six months of the year, and a further advance of $2.50 for the last six months, bringing the price by July up to $45 per ton in Chicago and New York.

It is pointed out that while the present price is $40 per ton, that is the gross price received by the manufacturer on American shipments only. When consideration is given to commissions, rebates and other concessions, transportation costs, and allowance made for the lower price on exports to overseas markets, the Canadian newsprint manufacturer has been netting less than $32 per ton at the mill on all sales in the last seventy-eight months.

Again, while the price of the finished product has remained stationary, cost of production has increased, making a change in price more imperative than ever.

Higher Production, Lower Earnings

The report of Price Bros. & Co., Ltd., (in bankruptcy) for the year ended March 31, shows that while the company's production of newsprint for the year amounted to 210,000 tons, as compared with 160,000 for the previous twelve months, the company's operating profit was only $681,952, as compared with $1,007,547 in the previous fiscal year.

After all deductions had been made, there was a loss of $108,146, as compared with a profit of $185,335 for the preceding twelve month period, this being before providing for depreciation and depletion and expenses connected with the company's bankruptcy. It should be mentioned that while the company's main interest is in the production of newsprint, it is also a large producer of lumber and other forest products.

The Hon. Gordon W. Scott, the trustee in bankruptcy, commenting on the company's gradually increasing rate of output of newsprint, refers to the handicap of the prevailing price level for newsprint, saying that it affords little or no profit to the industry, and that an advance in price is fully justified by increasing costs.

He remarks that the equipment of the various plants has been kept in an adequate state of repair and that the mills are modern and have sufficient supplies of wood within reasonable proximity for many years to come. When operated under normal and favorable conditions, the company's two newsprint mills, he adds, are reported to be among the lowest manufacturing cost newsprint paper units on the American continent.

Pulp and Paper Expansion in B. C.

Increased production of pulp and paper in British Columbia within the next few years is indicated by developments during the past two weeks.

Mutual Pulp and Paper Company, a newly organized enterprise to manufacture sulphite pulp at Prince Rupert, completed purchase of the floating drydock and shipyards from the Dominion Government for $500,000. The company undertakes to build a mill, and it is reported that the production of rayon pulp is planned by the new company. Financing arrangements have apparently been completed and it is reported that large tracts of timber in the Bella Coola district have been acquired.

Efforts to bring the Vancouver Kraft Mills of Port Mellon on Howe Sound into production were furthered with the organization of Port Mellon Operating Company, Ltd., which is to lease the plant of the kraft mill and produce lumber and sulphate pulp. Vancouver Kraft was organized in 1928 and the mill was built just before the industrial depression set in and lumber and pulp prices shot downward. The plant was never put in operation.

Canadian Newsprint To Be Free of Duty

The Dominion Government has made public cabled advice from Melbourne showing the Australian Government had made important abolitions and reductions of primage duties on some Canadian products exported to the Antipodes.

New tax schedules made public yesterday in connection with the Commonwealth's budget abolished primage duties on five Canadian products, crude asbestos, bronze powders, drugs and chemicals and printing paper, including newsprint, and Government motion picture scenic films.

Removal of primage on newsprint, asbestos and bronze powder will enable them to enter Australia free as the Commonwealth assesses no other taxes on them. Annual values of the goods shown in the schedule, published in last fiscal year's Canadian export figures, are: Newsprint, $3,804,751; book paper, $124,924; asbestos, $54,899; drugs and chemicals, $27,532. The Dominion exports only small quantities of bronze powder.

A further advantage to Canada in the Australian move

was seen by officials at Ottawa in the fact there was no indication the Commonwealth would take similar action on goods of any countries outside the British Empire, thus giving Empire countries additional preference in its market.

The abolished primages were: Printing paper, four per cent; crude asbestos, five per cent; bronze powders, 10 per cent and drugs and chemicals, five to 10 per cent.

Primage duties correspond to excise duties of three per cent. Canada levies on all imports from foreign countries. In Australia, however, the duties are variable and are applied before regular customs duties. They are used solely for revenue purposes.

Chief benefit to Canada was seen in the free entry of its newsprint to Australia as the customs rate on foreign newsprint is £4 (Australian) a ton (currently $15.88 in Canadian funds).

Value of Export Newsprint Up

Figures just issued by the Dominion Bureau of Statistics show that the 4,417,320 cwt. of newsprint exported in August had a value of $7,582,315, as compared with 3,678,592 cwt., valued at $6,396,808 in August, 1934. For the five months ending August the exports amounted to 21,326,940 cwt., valued at $36,311,089, as compared with 19,561,071 cwt., valued at $33,414,604 for the similar period of last year. Total wood pulp exports for August amounted to 1,072,536 cwt., valued at $2,355,879, as compared with 1,019,811 cwt., valued at $2,180,077 in August, 1934. For the five months ending August last the total pulp exports amounted to 5,245,132 cwt., valued at $11,205,510, as compared with 4,902,625 cwt., valued at $10,320,807.

D. Patrick Heads Miami Superintendents

[FROM OUR REGULAR CORRESPONDENT]

DAYTON, Ohio, September 30, 1935—David Patrick, superintendent of the Cheyney Pulp and Paper company, Franklin, was elected chairman of the Miami Valley, division of the American Pulp and Paper Mill Superintendent's association at the annual election of officers held at a meeting at the Elks country club on Middletown pike.

Other officers elected were: Val Frederick, superintendent of the finishing department of the Champion Paper and Fibre Company, Hamilton, first vice chairman and James Simpson, superintendent of the paper mill department of the Champion Paper and Fibre Company, second vice chairman. Kenneth Jackson of the Champion Paper and Fibre Company, was reappointed secretary to the chairman. Mr. Patrick succeeds Roy Maggart, superintendent of the card board department of the Champion Paper and Fibre Company, as chairman.

A ceremony was conducted for the initiation of 25 members into the "Chinese Order of Paper Makers."

Paper Industry on Uptrend

[FROM OUR REGULAR CORRESPONDENT]

DAYTON, Ohio, September 30, 1935—Continued uptrend in the paper industry is indicated in a report for August, published today by officials of the Miami Valley Paper Shippers' Association, with which 22 paper manufacturing firms of Miami Valley are associated.

Shipments were consigned during the month to 43 different points throughout the country and the total tonnage increased 87 per cent during the month, the report shows.

All shipments are made in truck or pool cars.

To Sell Outagamie Mill at Kaukauna

The following notice was sent out by Eric D. Lindberg, secretary of the Patten Paper Company, of Appleton, Wis., under date of September 28:

"We regret to advise you that as of September 26, 1935, A. C. Remley has resigned as vice-president and general manager of this Company; that we have arranged to sell immediately our Outagamie Mill at Kaukauna, where for the last six and one-half years we have been making, at a steady and material annual loss, most of our groundwood papers; and, that effective yesterday, William H. Zuehlke of Appleton, Wisconsin, has been appointed Receiver of the mortgaged real estate and personal property of our Appleton mill, which will be operated under his general direction, with the other officials at Appleton, excepting Mr. Remley, continuing as heretofore.

"For years, all of our mill brand papers, including Patten Text, Patten Mimeo Bond, etc., have been made at the Appleton mill; and there will, in consequence, be no change in this program. Funds have been provided to operate the Appleton mill on a normal manufacturing basis, and under normal financing conditions, beginning Monday, September 30.

"With the above matters clear, we have now turned our attention to the best method of handling the pay rolls, accounts payable, and bills payable, existing at the close of business today.

"Within the next two weeks, we hope, therefore, to have a definite proposal to present to all such creditors.

"Obviously, the most important part of the above announcement is the fact that we will continue the operation of the Appleton mill, since this unit has shown reasonable net earnings, after depreciation and all other charges, for the years 1933, 1934, and for 1935 to date; a fact which, of course, means that we have kept intact our profitable operation unit, with which, we hope, to liquidate, in due course, existing indebtedness."

Heads Georgia Union Bag

[FROM OUR REGULAR CORRESPONDENT]

HUDSON FALLS, N. Y., September 30, 1935—At a meeting of directors this week, Alexander Calder, president of the Union Bag and Paper Company, was elected head of the Union Bag and Paper Corporation of Georgia. The corporation was organized recently after plans had been completed by the parent organization for construction of a huge plant in Georgia. Other officers of the Georgia concern include John Wohnsiedler, vice president; H. S. Daniels, vice president; S. H. Brown, secretary; Pierre E. Bonin, treasurer.

RFC Loans To Paper Concerns

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., October 2, 1935—The August report of the Reconstruction Finance Corporation shows that during that month the corporation authorized a loan of $12,500 to the Franklin Paper Company, Holyoke, Mass. The report also shows the authorization of the loan for the paper and pulp mill of $3,850,000 to the Crossett Lumber Company, Crossett, Ark.

Join Stevens & Thompson Paper Co.

The Stevens & Thompson Paper Company, 205 East 42nd street, New York, announce that they have increased their sales staff by the addition of Walter J. Fountaine, who has been in the coarse paper business for the past seventeen years, and Warren Daniels, who has also had years of experience in the paper business.

Paper Executives Hold Annual Fall Meeting

Manufacturers and Merchants From All Sections of Country Attend Get-Together of National Paper Trade Association at Hotel Stevens, Chicago—Support of Practical Trade Practice Procedure Advocated—Many Important Addresses Given

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., September 30, 1935—The Fall meeting of the National Paper Trade Association, held at the Hotel Stevens, Chicago, September 23 to 26, drew an attendance of between 250 and 300 paper trade executives representing all parts of the United States and all lines of paper.

Arthur Chamberlain, secretary of the association, expressed the pleasure of the officers of the association over the large attendance, pointing out that it undoubtedly signified a desire to carry on association programs designed to clarify and improve the trade practice situation and strengthen the industry generally.

Keynote of Convention

From the majority of the closed meetings and equally prominent in the open sessions came the real purpose of the four-day program—to enhance support of the N.P.T.A.; to not let any opportunity slip in the drive for better business through practical trade practice procedure and to hold the various advances and improvements in market situations at a steady and strengthening point.

This, as those in attendance expressed it, was the keynote of a Fall meeting outstanding in the attention given to deliberations and remarkable for an absence of mismanagement and cross purposes which oftentime characterize meetings of such magnitude. This was taken as a tribute to Mr. Chamberlain and his associates who began with a novel indexed method of arranging the program and carried through with the least possible confusion.

An advance outline of the meeting was prepared at a meeting of the executive committee and board of directors of the N.P.T.A. on Saturday, September 21. First to go into session during the regular convention hours were the Book; Cover and Text; Blotting and Newsprint Committees of the Fine Paper Division and the Wrapping and Twine Committees of the Wrapping Paper Division. G. C. Cobean, W. W. White, W. N. Gillett and J. C. Marvin were the respective chairmen of the fine paper groups and Sidney Strauss, J. F. Blackman, A. J. House, G. W. T. Skinner and J. H. Bancroft of the coarse paper division.

Divisional Gatherings

During the afternoon of the same day the Fine Paper Division featured sessions of four other committees including Offset; Envelope and Survey Committees with A. M. Miller, J. D. Swigart and W. B. Killhour in charge. Development of the theme of the entire session was further registered in a lengthy meeting of the board of directors, with H. L. Zellervach presiding. The Wrapping Paper Division held sessions of its Merchandising and Survey Committees during the afternoon. The Western Paper Merchants Association held its general meeting and dinner in the West Ballroom of the Stevens at 6:30 P.M.

Tuesday saw the N.P.T.A. branching out into its opening general sessions with President H. L. Zellerbach pointing out the challenge thrust upon the association by the abandonment of code activities and urging all respective divisions to give consideration to the retaining of trade principles which had already proven effective. An address by Bennett Chapple, American Rolling Mill Company, outlined the tremendous possibilities of thorough public relations work with specific emphasis on advertising and proper merchandising methods. Mr. Chapple's remarks were very well received.

Manufacturers Report Conditions

Then came an interesting series of reports by manufacturers on conditions in their respective fields. F. J. Sensenbrenner, president of the American Paper and Pulp Association was on hand to deliver the opening remarks, followed by the following executives: A. C. Gilbert (rag content writings); H. W. Savage (sulphite writings); L. C. Anderson (kraft); G. H. Mead (book); L. A. Rossman (newsprint); H. S. Daniels (bags); C. H. Sage (groundwoods); D. C. Everest (sulphite wrapping); R. G. Westad (bristols) B. I. Reider (toilet tissue); F. M. Stephens (offset); Kendall Wyman (cardboard); F. P. Vaughan (towels); Irving McHenry (gummed tape); J. E. McGiffert (cups); and E. D. Martin (twine).

An address on "Facts and Their Need in Business Management" by Quincy Adams, of Dun & Bradstreet, rounded out the morning sessions.

Groundwood, Writing Paper, Bristol, Cut and Wrapper papers, and Box Paper Committees of the Fine Paper Division met the afternoon of September 24 with an eye toward consolidation of efforts at strengthening of these markets, according to reports. In charge were N. A. Considine, P. W. Lesh, J. P. Cunningham, H. G. Prosser and G. E. Buell. The Tissue and Gummed Tape Committees of the Wrapping Paper Division thoroughly covered the market situation in afternoon sessions with F. J. Weissinger and C. Warren Andrews as chairmen.

O. F. Marquardt Speaks

The address of Vice President O. F. Marquardt opened the September 25 meetings, Mr. Marquardt referring to the June deliberations of the association and to the desirability of consolidating gains made through the intensive efforts of the summer months. The matter of presenting important projects to the Fair Trade Practice Commission also received emphasis.

An address by D. L. Boyd on "The Printer and the Paper Merchant" was exceptionally well received, inasmuch as it particularly stressed common problems and pointed out the need of coordination in procedure as mutually beneficial. Later the morning session drifted into reports of various committees followed by discussions in which views were frankly stated and a great deal of excellent comment digested by the satisfactory attendance. Eleven committees gave reports.

The Wrapping Paper Division held one of its most important sessions on the afternoon of September 25, with Vice President Tracy presiding. Henry Matter, Wholesale Dry Goods Institute, gave the feature address in outlining "Uses of the Classification Program for Trade Protection." Mr. Matter's remarks were evidently sought as a further indication of the trend of the association toward a unified effort to work out its own problems. A discussion of legal problems given by J. K. Javits was reported to have stressed the need of observance to legislation no matter whether or not its constitutionality was questionable.

There followed reports of eight committees, including

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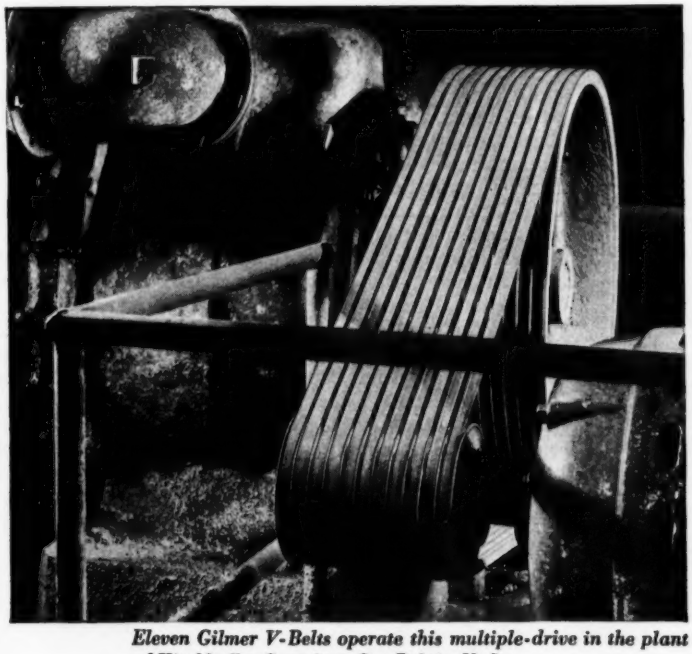

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Conveyor Belts · Round Roll and Endless Fabric Belting · Endless Belting · Endless Cotton Belts · Laundry Feed Ribbons

SPECIALISTS IN QUALITY BELTS SINCE 1903

the Merchandising and Survey committees, which were elaborated upon by the various members of the Wrapping Paper Division.

President Zellerbach's Address

On Thursday morning the semi-annual meeting of the National Paper Trade Association was held, with President Zellerbach presiding and delivering the president's address. His remarks were in part a consolidation of what had developed during the fore part of the session and gave a concise picture of the need for actual carrying out in practice of promised cooperation during the various sessions.

Reports of the board and of the treasurer, Charles Addoms, immediately followed, the latter indicating the financial support of the paper trade as a yardstick to measure continued efforts to utilize the association to work out its own problems. The report was optimistic in that it pointed out expansion and increased interest in Association work.

The able J. K. Javits, general counsel of the N.P.T.A. gave the address of the morning, and one of the feature discussions of the entire session, in describing "The National Paper Trade Association—What Can be Done—What Shall be Done." The attorney described the real job of the association, pointed out the achievements possible through unification of lines; through an improved relationship between mill and outlet and through strict adherence to those principles without which the entire industry would be in serious straits. Mr. Javits also indicated the hazards ahead if the association "does not do what it can do."

The convention adjourned on the note expressed by Mr. Javits which urged concerted action on the part of all committees; a continuation of the already well advanced effort to eliminate some trade practices with respect to selling, markets, etc.,

The final feature event was the annual Golf Outing of the Salesmen's Association of the Paper Industry held at Olympia Fields Golf Club on September 27 with a record crowd despite cold and threatening weather.

To Develop France's Pulp Industry

A strong movement is on foot in France looking to the greater development of the country's paper pulp industry, according to a report to the Commerce Department from Assistant Trade Commissioner J. G. Stovall, Paris.

It is claimed that France is capable of producing a much larger proportion of the raw products used in paper making than is the case at present. Although France is the third largest producer of manufactured paper in Europe, only a small percentage of the mills making various types of paper now produce their own pulp. Approximately 90 per cent of the raw products used in the French paper industry, that is, wood pulp, or wood for the manufacture of pulp, is imported from foreign countries.

A report recently issued on the French paper industry points out that the wood and wood pulp supplies of countries furnishing these materials to France are no longer inexhaustible.

As part of the program for developing the domestic paper pulp industry, the report recommends an increase in the duty on woods and paper pulp, the creation of new paper pulp factories using only domestic products, a program of reforestation of spruce and pine which would undertake the planting of 20,000 hectares of new forest land annually. The equipment of the industry for the manufacture of paper pulp in France is reported to be modern.

Government Paper Bids

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., October 2, 1935—The Government Printing Office received bids at 20.4 cents per pound for 57,000 pounds (2 000,000 sheets) of 50 per cent rag white glazed manifold paper as follows: Old Dominion Paper Company, Whitaker Paper Company, R. P. Andrews Paper Company, Dobler & Mudge, Graham Paper Company, and Barton, Duer & Koch Paper Company. A bid of 24 cents was also received from the Mathers-Lamm Paper Company.

For 29,100 pounds (150,000 sheets) of 50 per cent rag salmon index paper and 19,400 pounds (100,000 sheets) of 50 per cent rag, same yellow as follows: Barton, Duer & Koch Paper Company, at 12.6565 cents per pound; Aetna Paper Company, 14.89 cents; Marquette Paper Company, 12.6565 cents; George W. Millar & Co., 12.6565 cents; Reese & Reese, Inc., 12.6565 cents; Whitaker Paper Company 14.89 cents; R. P. Andrews Paper Company, 12.6565 cents; Mathers-Lamm Paper Company, 12.01 cents; and Paper Corporation of the United States, 12.6565 cents.

For 24,075 pounds (150,000 sheets) of 50 per cent rag white ledger paper (first bid) and 48,150 pounds (300,000 sheets) of 50 per cent rag blue same (second bid); J. W. Butler Paper Company, 12.7755 cents and 13.6 cents; Paper Corporation of the United States, 12.7755 cents and 13.06 cents; American Writing Paper Company, 12.7755 cents and 13.6 cents; George W. Millar & Co., 12.74 cents and 13.48 cents; Whiting Paper Company, 12.7755 cents and 13.6 cents; Bulkley, Dunton & Co., 12.7755 cents and 13.6 cents; Reese & Reese, Inc., 12.7755 cents and 13.6 cents; Whitaker Paper Company, 12.7755 cents and 12.59 cents; Old Dominion Paper Company, 12.7755 cents and 13.6 cents; Virginia Paper Company, 12.7755 cents and 13.6 cents; Aetna Paper Company, 15.03 cents and 16 cents; Barton, Duer & Koch Paper Company, 12.7755 cents and 13.6 cents; R. P. Andrews Paper Company, 12.7755 cents and 13.6 cents; Dobler & Mudge, 11.75 cents and 13.6 cents; and Mathers-Lamm Paper Company, 12.12 cents and 12.92 cents.

Japanese Paper Production Gains

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., October 2, 1935—The Japanese Paper Manufacturers' Association reports a total output of 215,209 short tons of paper by members of the association during the second quarter of 1935. In comparison with the corresponding period last year this figure represents a gain of nearly 19,000 tons, or approximately 10 per cent. The largest increases were registered in newsprint, simili, art and chromo, and ordinary printing paper, but all classes show an increase in output except packing and roll paper. Sales for the past quarter are reported at 212,108 tons, a gain of slightly more than 10,000 tons, or 5 per cent, over the corresponding period in 1934. Production of newsprint, which is the largest single item in this group, increased from 85,445 tons during the second quarter of 1934 to 93,700 tons during the second quarter of the current year. Sales during the same period increased from 88,926 tons to 93,803 tons. Prices quoted on foreign-style papers were steady during the period, showing practically no change compared with the preceding three months. Printing paper ranged in price from Y0.14 to Y0.15 per pound, wholesale, ex mill, depending upon grade. Kraft paper was quoted at Y0.15 and art paper at Y0.20 to Y0.22 per pound.

Ontario Paper Mills Continue Fairly Active

Manufacturers of Fine Paper Experience Steady Demand for Various Standard Grades, Although Tonnage Booked Ahead Is Light—Wrapping Paper Plants Only Moderately Busy—Orders for Paper Board More Frequent—Light-Weight Papers Active

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., September 30, 1935—Although the paper trade, both wholesale and manufacturing, is rather spotty on the whole, yet some lines are showing a distinct improvement and the market generally is firm. A few lines show lack of volume, notably in the coarse paper market, where carload lots are somewhat of a novelty. Small quantity buying by the consumer and by the distributor for the most part reflect conditions in the coarse paper market and in the paper bag department, with the exception of flour sacks, which have a ready market.

Most of the mills manufacturing fine papers are fairly busy under a steady demand for books, bonds, ledgers, offset and similar lines, although not much tonnage is booked ahead. Board mills for the most part are quite busy, the order having gone out from one eastern mill to a Toronto distributor to cease taking orders for immediate delivery until the machines have caught up.

Most of the other mills are receiving satisfactory orders and one is inclined to wonder what line of manufacture is absorbing the board in such quantities in view of the fact that the paper box trade is rather dull except for corrugated and set-up, which are quite active. The month just closed produced some nice business for the coated paper plants, although it slackened off towards the end of the month and at the moment activity at the coated mills is light.

There is little change in the paper converting field, where volume continues light. Lines such as envelopes and general stationery have been having a quiet time of it for some time now but conditions do not give promise of an imminent change. Publishers continue to be liberal consumers of various classes of paper and there is a fair call for news sheets and paper for publication uses.

In the light weight paper section of the paper trade business is fairly active and some firms claim more business so far this year than was booked last year during a similar period. There is quite a good demand for paper towels, napkins, toilet papers and paper novelties, while mills manufacturing glassine, greaseproof and waxing are getting a fair amount of business.

Bag Company Holds Convention

Making up an informal league of Nations and representing nearly every country on earth except Abysinia, 75 delegates to the seventh annual convention of the Bates International Bag Company, arrived in Toronto this week for a brief visit. They came from Montreal in five special cars and went on to Detroit. The group includes 45 delegates from Europe and South America, 25 of whom are making their first visit to North America. They were entertained at the Royal York Hotel and the Toronto Hunt Club while here and the Toronto visit followed stops at several paper plants in the east where they were the guests of the Saint Maurice Paper Company. It is the first convention the company has held on this side of the Atlantic.

Safety Progress in the Mills

D. B. Chant, secretary-engineer of the Ontario Pulp and Paper Safety Association, has returned to Toronto after a visit of inspection to the mills in the north-west section of the province, including plants at the Soo, Port Arthur, Fort William, Dryden, Kenora and Fort Frances. He stated that all of the mills were in excellent condition from the viewpoint of house-keeping and mechanical guarding. There was a marked interest being manifest in all the plants from a safety standpoint by both employers and employees. While not in Mr. Chant's department he said that there was every indication of a healthy condition in the paper industry generally in the north-west section and that business had apparently picked up greatly.

Notes and Jottings

The many friends of Joseph Pullan, vice-president of E. Pullan, Ltd., waste papers, Toronto, will sympathize with him in the sudden death of his four-year-old son, who was struck by a truck when his cycle got out of control.

Current dividend declaration of 12½ cents a share on the outstanding shares of Hinde & Dauch Paper Company, of Canada, Ltd., Toronto, makes the third successive declaration of this kind since December, 1934. The dividend declared in December last was the first distribution on the stock since 1930, and in writing shareholders in July last Vice-President and General Manager L. F. Winchell said it was the hope of the management that conditions of the future would enable the directors to make further dividend disbursements without interruption.

Extending its loading facilities at its Port Arthur plant, Provincial Paper, Ltd., has awarded a contract for construction of an addition to the plant's train shed.

Sale of the floating dry dock, shipyards and lands at Prince Rupert, B. C., formerly owned by the Grand Trunk Pacific Development Company, to the Mutual Pulp and Paper Mills of Prince Rupert, Ltd., has been authorized by the Dominion Government, it was announced this week at Ottawa. The pulp company pays $500,000 for the property and forfeits a subsidy arrangement whereby the Government had paid the Development Company $76,970 annually for operating the dry dock and shipyard. The subsidy had seven more years to run. The pulp company undertakes to continue the operation of the dry dock and shipyard and to build a pulp mill. It is stated that the mill will be used for the manufacture of rayon. The sale is from the Canadian National Railways, present owners of the property.

The tug *Garbentew*, of the Abitibi Power and Paper Company passed Thessalon the other day enroute to Sault Ste. Marie with Glanville Mississauga River pulpwood, 5,200 cords, the largest raft ever towed east of the Soo. Carney & Schultz's raft of pulpwood, the last of a large consignment, left this week for the same destination.

Maladministration by large financial groups instead of management by expert, practical men, is responsible for distress in the pulp and paper industry of Canada. the Hon. H. H. Stevens, Reconstruction party leader, said in a speech at Smith Falls. For many years the pulp and paper industry had suffered from financial domination and this domination had all but wrecked some excellent organizations.

Demand for Paper Still Active In Philadelphia

Various Standard Grades of Fine and Coarse Papers Continue In Good Request—Mill Interest In Paper Stock Diminishes—Harold Z. Zellerbach to be Guest of Honor at Meeting of Paper Trade Association of Philadelphia

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., September 30, 1935—Business activity in both fine and coarse divisions of the paper trade maintains the same level experienced all through the month of September. Paper stock merchants report a slowing down this past week, due to lack of demand on the part of the mills.

An invitation has been extended to all the members of the Paper Trade Association of Philadelphia to attend a luncheon meeting on Wednesday next at 12:30 in the Down Town Club, at which Harold Z. Zellerbach, president of the National Paper Trade Association, will be guest of honor.

Paper Bag Manufacturers Meet

More than 75 per cent of volume distribution of paper bags in the Philadelphia market was represented at the first fall meeting of the Paper and Bag Jobbers Association, which was held in the office of the association's secretary, Arthur H. Lewis, 1106 Franklin Trust Building.

Charles Resnick, of L. Resnick & Son, was unanimously elected chairman. A committee consisting of both large and small operators was chosen to guide the association's activities during the coming year and to build up good will between member and jobber and between distributor and consumer. Appointed to this committee are Frank Dubin, of the Dubin Paper Company; James Gallen, of the Gallen Paper Company; William J. Cairns, of the Cairns Paper Company; Benjamin Kessler, of Kessler Paper Company; J. Zacher, of Atlas Paper Products Company; George Bossler, of G. A. Bossler & Co., and Benjamin Tubis of Tubis Paper Company.

At the association's meeting to be held this evening, E. S. Melia, executive secretary of the Paper Bag Manufacturers' Institution, will be guest of honor.

Cost Accounting System Praised

At the convention of the National Paper Trade Association, held at the Hotel Stevens in Chicago last week, Quincy Adams, of Dun & Bradstreet, credit reporting agency, paid a glowing tribute to William B. Killhour, president of Quaker City Paper Company, 303-311 Vine street, Philadelphia, and chairman of the Joint Survey Committee of Fine and Wrapping Paper Divisions of the National Association; for the committee's splendid work in developing and compiling such concrete statistics with regard to the cost accounting system, which has been standardized during the past fifteen years after thirty years of study on the part of the National association. Mr. Adams stated that this cost accounting system, which has proved invaluable to its users, is comparable to the Dun & Bradstreet system, developed by their research and statistical experts.

Mr. Killhour participated in both morning and afternoon sessions held on Wednesday. His topic was the standard cost accounting system. He prefaced his remarks which in substance were as follows: What is the Survey Committee Doing and Why? The fundamental problem for any business has always been "costs"—cost of doing business. This, he said, is a problem common to us all—it is the language we can all understand. Hence the committee's job has been to answer three questions: What Are My Costs? What Are My Competitor's Costs? What Is the Paper Business in General Doing?

Many paper merchants have measured their costs by the rule of thumb method and many are content with this archaic procedure, but a survey reveals this type of merchant is not the progressive type and at the end of the year invariably finds himself in the "red."

This standard cost accounting system has been constituted and thought out by some of the best brains in the paper trade and has been checked and rechecked by such accounting specialists as Ernst & Ernst and the Business Research Corporation of Chicago, and was also approved by the authorities in Washington during the NRA regime. Its infallibility is such that it has never been deemed necessary to make any change—in fact the years of experience have proved its worth—it tells the truth—reveals the facts underlying our business. It makes way for clear, logical and practical merchandising, and yet it is simple to understand and easily handled. Moreover, it is available to all who are members of the National Paper Trade Association; those who have used it can attest its worth to them in savings of dollars and cents.

The Survey Committee has formulated questionnaires to find out comparative and average costs among members of the trade using the cost account system and those who perchance have not yet installed same. Another questionnaire is designed to obtain a better picture of the trade in general and will be released within the next six months. It was also decided to prepare a questionnaire dealing with salesmen's compensation, traveling expenses, and additional forms furthering the development of the general chart of the paper business activity for the benefit of each respective division and for the new social security legislation.

News of the Industry

The Moore & White Company has been working evenings and Saturdays until 8 o'clock on some new special machinery for paper mills.

L. R. Cranblatt, sales manager for Whiting-Patterson Company has just returned from his vacation at Chatham, New York State.

Jno. H. Heald Co. Starts Building

Work on a new addition to the plant of the Jno. H. Heald Company, Lynchburg, Va., has just been started. This includes a complete new building for housing a 100-ton breaker beater and system for handling mixed paper stock.

The Dilts Machine Works, Inc., Fulton, N. Y., has been given the order to furnish the breaker beater and system which will include a new Cowles refiner-screen recently developed to defiber and screen the stock after the breaker beater and rejects the trash in the stock such as cellophane, rubber bands, excelsior, paper clips, etc.

When the new installation is in operation at Lynchburg it will represent the most modern mixed paper plant and is novel, in that the entire equipment will be driven by a steam turbine, the exhaust from which will heat the water for the breaker beater system.

The engineering work is being handled by the engineers of the Mead Corporation at Chillicothe, Ohio, and is expected to be in operation before the first of the year.

Taylor "Valv-Precisor"

As the demand for closer control of processing increases, engineers are constantly impressed with the fact that a diaphragm valve cannot always follow the dictates of the controller and therefore cannot produce the desired accuracy of control.

There are many factors which prevent correct positioning of valve discs. A major one is hysteresis (friction and lost motion) of diaphragm motors, existent to a degree in all diaphragm motors, but to a greater extent in those of older design. Pressure fluctuations of the controlling medium through the diaphragm valve tend to force the disc of a single seated valve out of its proper position. Other factors include friction in valve stuffing box due to worn packing or excessive tightening of adjustments, properties of controlling medium which may cause valve stem to pit or corrode or result in formation of salts, and worn parts in valve due to long service.

These factors affect the accuracy of control only to a small degree on high sensitivity applications (those involving small time lags) because only a slight deviation from the control point will increase or decrease the air pressure to the diaphragm motor sufficiently to fully open or close the valve. But on applications involving reasonably large time lags the sensitivity of the controller must be adjusted to much lower values to produce throttling control. Consequently, when the valve-stem is opposed by the forces mentioned above, considerable deviation from the control point will occur before the output of air pressure from the controller will be sufficient to move the valve disc. This causes an undesirable oscillating type of control.

Heretofore the only instrument which could precisely position a valve stem when opposed by these forces was the recently developed Taylor "Dubl-Response" Control Unit—an auxiliary control device designed primarily to accurately compensate for changes in load; precision-valve-action being an added feature to give double assurance of precision control. The precision-valve-action feature proved so vitally important, however, in solving this most difficult type of control problem that the Taylor Instrument Companies decided to make this feature available in a separate instrument for those applications where load changes are not a problem but valve-stem friction and diaphragm-motor hysteresis must be overcome to obtain precision control.

The manufacturer claims that, in general, any air-operated controller, with the aid of the "Valv-Precisor," can position the valve disc 50 times more accurately when opposed by valve-stem friction and diaphragm-motor hysteresis than when the device is not used. Naturally, this greater accuracy is reflected in the greatly improved control obtained.

This device is recommended on all processes which have time lags or heat capacities demanding a low or medium controller sensitivity, provided that load changes are negligible or infrequent. It is unnecessary on processes with short time lags which permit a high controller sensitivity. It should not be used on processes involving large time lags and load changes. For such applications the Taylor "Dubl-Response" Control System is recommended.

The Taylor "Valv-Precisor" is a compact unit (case dimensions 8″x5″x2″) which can be mounted on any diaphragm valve, and can be used in conjunction with any air-operated controller. However, it must be so located on the diaphragm valve that a direct, rigid connection always is maintained with the valve stem. A 25 lb. per sq. in. air or gas supply is recommended for most efficient operation.

A non-corrosive case and cover protect the mechanism. The only necessary adjustment is to adapt the mechanism to the full travel of the valve stem. The air system is simple and essentially fool proof. An indicator which shows the actual percentage of valve opening is visible through a small glass window. Complete details will be furnished by the Taylor Instrument Companies, Rochester, N. Y.

E. D. Jones Gets Order for Savannah Mill

In its issue of September 25, the *Eagle* of Pittsfield, Mass., says:

"Word was received here today by E. D. Jones & Sons that the local manufacturers of paper mill machinery have been awarded the contract for the bulk of the machinery to be used in the Union Bag and Paper Company's new $4,000,000 plant in Savannah, Ga."

The contract between Union Bag and the Jones Company calls for the supplying of most of the major machines of the stock-preparation part of the mill, such as paper machine screens and Jordans.

Ten Jordans are to be made, and four large Jones screens. The order will take from two to three months to complete. Company officials feel also that the awarding of the contract makes it possible that the Pittsfield firm will also furnish many of the minor items throughout the mill, such as valves and pumps. The latter order, if received, would be about as large as the one already received.

Mohawk Paper Mills Not to Close

H. T. Johnson, vice president of the Mohawk Paper Mills, Inc., Cohoes, N. Y., writes under date of September 27, as follows:

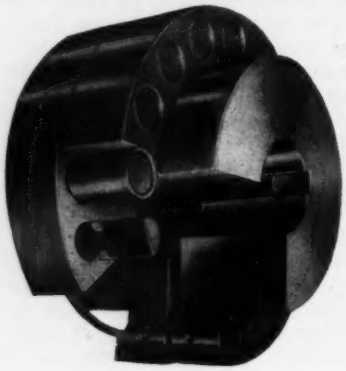
"Rumors to the effect that we are closing our mill October 1, seem to have gained headway and it would be deeply appreciated if you would insert somewhere in the next issue of the PAPER TRADE JOURNAL a paragraph correcting this. Nothing could possibly be further from the truth.

"The rumor may have gotten started because we are closing our Boston local sales office October 1, and Boston will be covered direct from the mill by our George F. Morrison."

Number Seven in the Redemption Bond Letterhead Parade reached the desks of Chicago paper buyers during the week. Mailed out by the Swigart Paper Company, the folder contains actual letterheads, discusses the reasons for style, color, etc., and features a price list for Redemption bond and envelopes to match in white and thirteen colors. Number seven pays particular attention to the development of a letterhead for a charity organization society.

Improved Francke Flexible Couplings

New and important changes in the design and materials of the Francke Flexible Coupling are announced by the John Waldron Corporation, New Brunswick, N. J. The changes have been made to meet the changed operating conditions which have occured in the field of mechanical power transmission within the past few years.



All Francke Coupling flanges, except the larger sizes, are now being made of a forged high manganese alloy steel. The larger sizes are molded of high grade semi-steel.

In order to prolong the life of the moving parts of the coupling, self lubricating, wax impregnated bronze bushings now replace the old style dry bushings. The new bushings have highly polished bearing surfaces which provide a large contact area. Due to their self-lubricating feature, little resistance is offered to the end-wise movement of the shafts of the connected machines when under load.

Another important improvement is in the design of the cross pins by which the crucible spring steel laminations are held within the keepers. The center portion of the cross pins which passes through the perforation in the laminations is now made glass hard. By a special process the ends of the cross pins are expanded in to the tapered recesses of the keepers thereby making it impossible for them to become loose.

With these and other improvements it is claimed by the manufacturer that the Francke is now as trouble free as it is possible to build a flexible coupling. Detailed information upon the improvements is contained in a new catalogue just off the press.

Companies Join Technical Association

During the current year a number of supply and equipment companies have become company members of the Technical Association of the Pulp and Paper Industry. These include the following:

Crane Company, Chicago, Ill., manufacturers of paper mill valves, piping and heat exchangers. The representative in the Association is M. W. Link.

A. M. Meincke Inc., Chicago, Ill., dealers in special starches and paper fillers. The representative in TAPPI is H. D. Meincke, President.

American Brass Company, Waterbury, Conn., makers of seamless brass and copper pipe, tubes, bronzes and other metals. The representative is, J. T. Kemp, Service Engineer.

Mathieson Alkali Works, New York, N. Y., makers of chlorine and alkalies. The representatives are Hoke Martin in Chicago, Ill., and W. L. Savell in New York.

Johns-Manville, New York, N. Y., manufacturers of heat insulation materials, transite hoods and pipes, suction box covers, etc. The representative is J. W. Hemphill.

Electro Bleaching Gas Company, New York, N. Y., makers of chlorine and caustic soda. The representative is S. W. Jacobs, Vice President.

Reliance Electric Company, Cleveland, Ohio, makers of motors, etc. The representative is J. W. Corey.

Bauer Brothers Company, Springfield, Ohio, makers of refiners and pulpers. The representative is C. L. Bauer, President.

Testing Machines Inc., New York, N. Y., makers of pulp and paper testing instruments. The representative is H. Z. Schniewind, president.

Stowe-Woodward Inc., Newton Upper Falls, Mass., makers of deckle straps and rubber covered rolls. The representative is E. L. Tewksbury, Sales Manager.

Thwing Instrument Company, Philadelphia, Pa., makers of pulp and paper testing instruments.

Oliver-United Filters Inc., New York, makers of filters, deckers, etc. The representative is Charles Fuhrmeister, Jr., Eastern Manager.

Castle & Overton Inc., New York, N. Y., importers of wood pulp. The representative is G. W. Oliphant, vice-president.

Chemipulp Process Inc., Watertown, N. Y., engineers and makers of sulphite pulping systems. The representative is A. D. Merrill, president.

Gottesman & Co., New York, N. Y., importers of wood pulp and dealers in chemicals, is represented in TAPPI by A. J. Sigel.

Rice, Barton & Fales Inc., Worcester, Mass., makers of paper making machinery.

Lagerloef Trading Company, New York, N. Y., importers of wood pulp.

W. S. Tyler, Cleveland, Ohio, makers of fourdrinier and cylinder wires.

Combustion Engineering Company, New York, N. Y., makers of the Murray-Waern recovery system and steam plant equipment.

Samuel M. Langston Company, Camden, N. J., makers of paper slitters, winders, corrugators and other paper machinery, is represented in the Association by B. W. Langston.

Indianapolis Reports Improvement

[FROM OUR REGULAR CORRESPONDENT]

INDIANAPOLIS, Ind., September 30, 1935—While there was no noticeable increase in demand during the last week, the general paper market has a strong undertone and most of the local trade is convinced this fall and winter will see improvement. For one thing, inquiries in practically all the items are becoming more numerous. What the state needs now is some really cool weather. A change to real autumn weather would help demand from several sources.

There is a good demand, however, from the printing industry, much of the fine paper stock going into direct by mail advertising. The larger local advertisers are using more space than they did last year in the newspapers and this coupled with the buying of the national advertisers has kept linage up to a high point. There is some criticism on the part of publishers concerning prices of newsprint, but there does not seem to be much to be done.

Local converters say there is a good demand. Tonnage now is considerably better than it was a year ago and this year as a whole will be better than last year. However, prices are low and no amount of effort seems adequate to bring them up to a point where a reasonable profit can be made.

Books and covers are moving in fair shape, according to local jobbers. Some of the larger publishers of the state have some nice contracts and their orders are active and somewhat larger than they have been. The summer specialty season is over, demand falling to rock bottom during the last week. Tissues are reported moving nicely, however.

Paper Demand Better In Boston

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., September 30, 1935—The paper market here improved as a whole during the last week. With woolen and worsted mills operating full time and manufacturing concerns active in many other industries, there was a good general demand for wrapping paper and to some extent at least for fine. Individual statements at wholesale houses varied. At the office of a firm handling both fine and wrapping paper, business was reported as very good for the week, especially for the latter part of the month, when the demand is usually quieter. Some in the fine paper division reported the week as slow, others fair, and still others a larger volume of sales. Another concern noted that September was a better month than the corresponding one a year ago. In some quarters the month showed an improvement for the first two or three weeks. The New England office of a large manufacturing concern reported that while the month as a whole was slow, the market was a little better last week. The wrapping paper market displayed a slight improvement. Conditions in the paper bag industry continued generally more favorable.

Demand for box boards was at least fair, increasing over previous weeks. Box manufacturers reported more business. The call for material for shoe cartons, which declined for a few weeks recently, has resumed. Deliveries of board are not quite so prompt as they were, due to the increased volume of orders.

The position of paper stock was at least fairly favorable, with prices generally strong. In old papers the prices of mixed papers and old newspapers continued firm. Kraft No. 1 sold in Boston at 1.10 and was reported as moving at .90 in New York. Bagging was active. Both foreign gunny and foreign burlap sold at 1.85 @ 1.90. There was a good demand for new and old domestic rags. In the latter group, roofing rags have stopped advancing, but continued firm at prevailing prices, with apparently no prospect of lower levels at present. In foreign rags, there was at least a fair demand, with dark cottons moving at 1.55 @ 1.60. The general feeling among cotton twine jobbers was encouraging.

New Conway Sleeve Clutch

A new Conway disc clutch for restricted swing radii and also fractional horsepowers is announced by the Conway Clutch Company, 1543 Queen City avenue, Cincinnati, Ohio. It carries on the features of design and construction of the standard Conway Disc Clutches—full floating plates, high ratio leverage, easy engagement, instant release, and free idling. The Clutch is machined all over and presents a neat cylindrical contour. It can be furnished to operate dry or in oil. The power factor can be increased with the limited addition of drive plates, while retaining swing reactions.

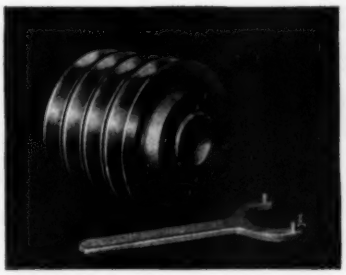
Praises Cuban Trade Agreement

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., October 2, 1935—Extolling the trade agreement with Cuba which has now been in force for a year Secretary of State Hull says that "imports of transparent cellulose sheeting from the United States, which met keen foreign competition, have, through a decrease in Cuban duty, been enabled to regain a satisfactory share of the market. Imports (for the full 12 months) increased to 88,352 pounds, an advance of 55.8 per cent over the 56,693 pounds imported during the preceding twelve months period."

Vari-Pitch Texrope Sheave

The Allis-Chalmers Manufacturing Company now offers a very important new development in power transmission known as the Vari-Pitch Texrope sheave. By means of a simple adjustment which takes but a few moments, the pitch diameter of this new sheave can be changed so as to give variations in speed as high as 15 to 25 per cent per sheave. If both sheaves of a drive are of this new type the range of variation can be doubled.



These Vari-Pitch sheaves are made in two multi-groove types, stationary and motion controlled. The stationary controlled type is recommended for applications that require occasional change of speed. The motion controlled type is recommended for applications that require frequent quick changes within the full range while the drive is in operation.

The new Vari-Pitch Sheave drive, which uses texrope belts, retains all the inherent advantages of the texrope drive and will find useful application to a wide variety of industries having variable speed requirements. It permits higher or lower speed operation according to the respective product range requirements of the driven machine. The Vari-Pitch Sheave is especially desirable for V-belt drives formerly employing several sets of sheaves to meet the occasional changes in speed.

Norwegian Paper Industry Unfavorable

In contrast to the general economic situation in Norway, conditions in the paper and pulp industry have continued unfavorable, according to a report from Vice Consul Walter C. Dowling, Oslo, made public by the Commerce Department. The outlook for newsprint and paper producers, at the end of the first half of this year was comparatively satisfactory, the report states, but this factor was more than offset by unfavorable developments in both the mechanical and chemical pulp branches.

As regards mechanical pulp, considerable optimism prevails for the coming year, due to the export quota agreement for the Scandinavian countries, but market conditions during the second quarter of 1935 were probably more unfavorable than at any time during recent years.

Production of chemical pulp also declined during the second three months of this year, although only one mill was shut down as a result of lack of orders. The output of sulphite pulp for the quarter totaled 82,100 tons, a decline of approximately 10 per cent as compared with the first quarter total. Exports increased during the second quarter, but for the half year were somewhat less than in the corresponding period last year, owing to a decline of approximately 28 per cent in shipments to the United States.

On the basis of exports and information from the industry, newsprint production is estimated to have shown a further expansion during the second quarter, and the output of other types of paper is also reported to have increased, although not in proportion to the rise in newsprint production.

CONSTRUCTION NEWS

A Summary of Vital Facts Regarding Construction, Finances and Operation of Paper Mills

Construction News

Newark, N. J.—The Seeley Tube and Box Company, Thomas street, manufacturer of paper boxes and containers, paper tubing, paper cores, etc., has concluded arrangements for lease for period of ten years of former local factory of the Kolster Radio Company, 360 Thomas street, comprising a three-story building with about 60,000 square feet of floor space. Company has taken possession and will develop for plant. W. W. Halle is general manager.

Canton, N. C.—The Champion Fibre Company has approved plans for a new water filter plant at local mill, and will begin construction at once. General contract has been let to the Reed & Abee Company, Asheville, N. C.

Los Angeles, Cal.—The Western Candy Box Company, 1243 East 63rd street, manufacturer of paper boxes and containers, fancy boxes, etc., for confectionery service, has plans under way for new one-story addition to plant, 30 x 45 feet, and will begin superstructure at early date. It will cost close to $25,000, with equipment. W. R. Hagedohm, Tenth street and Western avenue, is architect.

Charlotte, N. C.—The Peerless Paper and Box Company, recently organized with capital of $20,000, plans operation of local plant for manufacture of paper boxes and containers. New company is headed by K. I. Ibrams, Charlotte.

Everett, Wash.—The Soundview Pulp Company has begun construction of a new addition to local mill, to be used for expansion in the digester division. New unit will be one-story and will be the largest structure at the plant. New equipment will be installed. It is proposed to have expansion completed by close of the year. Cost over $50,000, with equipment. Leo S. Burdon is general manager.

Wallingford, Conn.—The Fort Trumbull Paper Corporation, recently organized with capital of $50,000, is said to be planning early operation of a mill in this vicinity for production of a line of high-grade paper stocks. Charles F. Brodman, Kew Gardens, Long Island, New York, is president of new company, and D. R. Earl, Stamford, Conn., secretary.

Newark, N. J.—The Newark Envelope Company, recently organized, has leased space in local building at 71-73 Clinton street, totaling about 4500 square feet of floor area, and will occupy for new converting plant. Operations will begin at early date.

Sheboygan, Mich.—The North American Pulp and Paper Corporation is beginning production on limited scale at new local mill, formerly the Sheboygan Paper Mill, idle since early in 1928. The plant was acquired by the North American Company last March, and since that time reconditioning and improvements, with installation of new machinery, have been in progress. The plant will specialize in the production of pattern tissue stocks, to be used by the Simplicity Pattern Company, Niles, Mich., an affiliated organization. Operations will be increased to a three-shift basis at early date, and it is expected to give employment to about 100 men at the mill during the next sixty days, which will be close to estimated normal working quota. T. D. Griffith is vice-president of company at the mill. Main offices are at 419 Fourth avenue, New York, N. Y.

Chicago, Ill.—The Container Corporation of America, Inc., 111 West Washington street, Chicago, manufacturer of corrugated and other paper boxes and containers, is said to be expending close to $1,000,000 for extensions and improvements in various mills in different parts of the country during the present year, including building extensions and equipment installations. This is approximately one-half of the gross sum used for similar purposes last year.

New York, N. Y.—The Kieckhefer Container Company, 250 Park avenue, New York, manufacturer of paper boxes and containers, with main mill at Delair, N. J., has taken over space in the Haywood-Wakefield Building, 516-24 West Thirty-fourth street, recently secured under lease, totaling about 25,000 square feet of floor area. It will be used for a new metropolitan assembling and distributing plant.

Polson, Mont.—The Polson Chamber of Commerce is interested in a project to construct and operate a local pulp and paper mill, and is sponsoring a plan for financing through Federal aid in amount of $2,000,000 to carry out the enterprise. Application for latter has been filed. It is understood that a company will be formed to operate the proposed mill, which will consist of several units for pulp and paper-making divisions, with power house, machine shop and other mechanical departments. Preliminary plans for different structures are under way. The plant will be equipped for initial capacity of about 100 tons per day. E. E. MacGilvra, Polson, state senator, is active in the project and will be interested in the mill.

Sturgis, Mich.—The National Carbon Coated Paper Company, manufacturer of special paper stocks, etc., is running on increased production schedule at its two local plants. A day and night shift has been established at each mill, giving employment to about 300 persons at the plants.

Prince Rupert, B. C.—The Mutual Pulp and Paper Mills, Ltd., recently organized by interests at Vancouver, B. C., represented by F. L. Buckley, 1030 Hamilton street, Vancouver, has concluded arrangements for purchase of property of the Grand Trunk Pacific Development Company, Ltd., at Prince Rupert, consisting of large tract of land, improved in part with shipyards and a floating dry dock. Available site will be used for the construction of proposed new pulp and paper mill,

which will comprise a number of buildings, equipped for a capacity of 250 tons of bleached sulphite per day and corresponding paper-making output. New plant is estimated to cost close to $5,000,000, with equipment, and is scheduled to be ready for operation in 1936. As previously noted in these columns, the company is also planning the development of timber properties in the Queen Charlotte Island and Skeena River districts, for pulpwood supply. In accordance with terms of property purchase noted, the company will continue the operation of the present shipyard and dry dock as a feature of activities. A consideration of about $500,000 was given for the land and properties, which have been held by the Canadian National Railways. Water facilities, including loading docks, etc., will be constructed by the Mutual company for the new paper mill.

Wenchow, China—The Ministry of Industry, Government of China, Shanghai, China, has approved preliminary plans for construction of a new pulp and paper mill at Wenchow, Chekiang Province, where large tract of land has been selected. The plant will be operated under Government control. It will consist of a group of one and multi-story buildings for pulp and paper-making divisions, with power house, pumping station and other mechanical departments. Entire project is reported to cost over $1,500,000, including equipment.

New Companies

Chicago, Ill.—The J. J. Lipp Paper Company, Room 1138, 8914 South Loomis street, has been incorporated with capital of 100 shares of stock, no par value, to deal in paper products. The incorporators are J. J. Lipp, Meyer Morton and John E. Taylor.

New York, N. Y.—The Plymouth Card and Paper Corporation has been organized with capital of $20,000, to manufacture and deal in card and paper specialties. New company is represented by Milton B. Barnett, 185 Montague street, Brooklyn, N. Y.

New York, N. Y.—Graphicut Displays, Inc., has been incorporated with capital of $20,000, to manufacture card and paper specialties of various kinds. Sidney Mormar is one of the incorporators. Company is represented by Isadore P. Eisenberg, 32 Court street, Brooklyn, attorney.

Alton, Ill.—The Midwest Wire and Paper Products Company has arranged for change of company name to the Keller-Flesch Paper and Supply Company.

New York Carrying Out Reforestation

ALBANY, N. Y., September 30—Announcement is made by the State Conservation Department that the fall reforestation program is in full swing on 50,000 acres of land and when the season is concluded it is estimated that 40,000,000 trees will have been planted, the largest number ever placed on the reforestation tracts in a single year. Daily shipments are being made from each of the several tree nurseries maintained by the department. Planting operations are being carried on extensively in Alleghany, Chenango, Chautauqua, Cortland, Franklin, Jefferson, Lewis, Madison, Oswego, Otsego, St. Lawrence, Schuyler, Steuben, Schoharie, Tioga, Tomkins and Suffol counties.

In an address at Lake Placid commemorating the state's celebration of 50 years of conservation work, Governor Lehman declared that he was informed that the Conservation Department has already purchased or contracted for nearly 300,000 acres of submarginal land and has reforested about 150,000 acres of it. Within the next decade, he said, it is probable that a million acres will have been purchased and reforested, he said, thereby replacing a considerable part of the losses of the last few generations.

ANALYSES PAPER SITUATION

(Continued from page 13)

ton, Wis., and William K. Andrew, of Wauwatosa, Wis., by the United States patent office, on an application made in November, 1934. Both men are employed by the Marathon Paper Mills Company, which has carton divisions at Menasha and Wausau, Wis. They have been working on the invention for the last five years. Assignment of commercial rights has been made to the Marathon company. The container is one in which the end portions are removable. They are attached by fitting into locking slots, and then being screwed on. The patent examiners found seventeen points of originality and improvement.

Practically the entire 31,000 cords of pulpwood rafted across Lake Superior to Ashland, Wis., by the Consolidated Water Power and Paper Company have been reshipped by rail to the company's mills at Wisconsin Rapids and Biron, Wis. Twenty-seven men have been kept busy at the loading hoist. Two thousand cords were shipped to the Flambeau Paper Company, Park Falls, Wis.

The Employers Mutual Fire Insurance Company of Wausau, Wis., has been licensed by the insurance commissioner of Wisconsin, and has started doing business. It is a companion company of the Employers Mutual Liability Company, organized years ago largely by paper manufacturers to handle workmen's compensation insurance. Among the directors of the new company are Charles S. Boyd, president of the Appleton Coated Paper Company; Ben Alexander, president of Masonite Company, Wausau, Wis.; D. C. Everest, vice-president of the Marathon Paper Mills Company, Rothschild, Wis., and C. C. Yawkey, president of the Marathon Company.

George Banta, Sr. Dead

George Banta, Sr., founder and president of the George Banta Publishing Company, Menasha, Wis., one of the largest in Wisconsin, died September 23 at his home at Menasha, after a period of ill health. He was one of the organizers and former president of the Central Paper Company, a converting and specialty plant at Menasha, and also a director of the First National Bank of that city.

Active in civic and community affairs for many years, Mr. Banta served several terms as mayor of Menasha. He held national offices in several fraternities, was a charter member of the Menasha Club, a member of the North Shore Golf Club, and a thirty-second degree Mason. He was a naturalist and maintained beautiful gardens.

Funeral services were held at St. Thomas Episcopal Church of Menasha, and burial was made in Oak Hill cemetery at Neenah, Wis.

Provincial Paper Makes Improvements

Provincial Paper, Ltd., head office Toronto, are adding some improvements to their mills at Port Arthur and Mille Roaches, Que. At the Quebec plant they are installing a new electric drive on No. 1 machine and at Port Arthur the wet end of No. 1 machine is being entirely rebuilt with a view to increasing the trim by about 7 inches The improvements are also designed to increase both the quality and the production of the plant.

Champion Issues Approved

CINCINNATI, Ohio, September 30, 1935—The Securities and Exchange Commission has notified the Cincinnati Stock Exchange that registration of the Champion Paper and Fibre Company's 476,000 shares no-par common stock, 60,000 shares 6% cumulative preferred stock, $100 par, and $5,500,000 3¼% sinking fund debentures, due 1950, had been approved.

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FOREIGN PAPER DEMAND SHOWS GAIN

Exports of paper and paper products from the United States during July continued to show an upward trend according to the Forest Products Division of the Dept. of Commerce. Shipments of all classes of paper, board and converted products reached a total value of $1,807,695, an increase of close to 20 per cent over the preceding month and also over the corresponding month last year. A comparison of the quantity figures for various classes likewise shows in most instances a rise in the July 1935 figures compared with either of the other two months. Newsprint exports, which have been running far ahead of last years, dropped off nearly 40 per cent as compared with June but were still more than six times the July 1934 shipments.

Exports of book papers were 15 per cent higher than in the preceding month but were slightly less than a year ago, while writing paper exports did not change much during July as compared with June but were nearly double those of the corresponding month in 1934. Exports of surface-coated and tissue and crepe papers in both instances exceeded those of the other two months. In the coarse field, shipments of wrapping papers, including over-issue news and boxboards exceed either June or the corresponding month last year. The increase in boxboard shipments, however, were about offset by losses in the other classes of paper boards. Exports of building papers, on the whole, show improvement. Shipments of wallboards dropped off nearly 40 per cent as compared with June and were also less than during the same period last year. This loss was more than offset by the gains registered in exports of insulating boards and sheathing papers.

Exports paper base stocks dropped off during July. Shipments of sulphite pulp and bags, which make up the bulk of these exports, having declined more than 50 per cent compared with July 1934. Shipments of sulphite pulp were also 17 per cent under the June shipments. Total exports in this group were valued at $469,944 during July as compared with $558,279 in June and $898,823 a year ago.

Imports of pulpwood and wood pulp underwent a further decline during July, imports of the former having been 56 per cent less and of the latter 17 per cent less than a year ago. Imports of bleached sulphite and soda pulp were considerably higher, but increases here were insufficient to offset the losses in other classes of pulp. Imports of rags and other waste were also higher than a year ago, and rag receipts exceeded the June figure. Total imports of this group for the month were valued at $7,149,519 as against $6,708,479 in June and $7,365,816 a year ago. July figures comprised 82,271 cords of pulpwood valued at $1,506,942; 142,572 tons of wood pulp valued at $5,368,326 and 10,090 tons of rags and other waste valued at $274,251.

Imports of newsprint during July dropped off slightly compared with either June or July 1934. That prices on the average are lower is indicated by the fact that July receipts of 190,872 tons valued at $6,532,467 represent a decrease of 3 per cent in volume but 5 per cent in value compared with the corresponding month last year July receipts were also 6 per cent in volume and 7 per cent in value under June.

Imports of other classes of paper and relatively small newsprint accounting for between 85 and 90 per cent of the total paper receipts. The most important items are boards, kraft wrappings and cigarette papers. All of these receipts show a decrease compared with June. Imports of boards and cigarette papers were also considerably under those recorded during July 1934. Kraft receipts, however, were about 25 per cent higher.

PAPER AND PULP SECTION OF N. S. C. TO PRESENT INTERESTING PROGRAM

A concentrated drive against a common enemy—accidents—will be made when some 7,000 delegates representing all walks of life, all parts of the United States and several foreign countries assemble at Louisville, Kentucky, to attend the sessions of the 24th Annual Safety Congress and Exposition from October 14 to 18.

Many topics of unusual general interest have been woven into the five-day program of the Congress. So great has been the preliminary interest in the gathering that the three official hotels—the Kentucky, the Brown and the Seelbach—will probably be taxed to capacity in taking care of the delegates.

More than 360 speakers will be heard during the 120 sessions. Every conceivable phase of accident prevention will be covered.

While much attention will be focused on street and highway traffic sessions, emphasis will also be placed on accident prevention in industrial plants of all kinds, in the home, in schools, in the air and at sea. Separate programs have been arranged for industries in the individual sections. There will also be general sessions on Industrial Health, Industrial Nursing, Occupational Diseases and First Aid.

Many special exhibits are planned, the most important

of which will be a huge display of equipment developed in recent years for safeguarding dangerous operations of all kinds.

Among the featured speakers will be John E. Long, president of the National Safety Council; William S. Knudsen, vice-president of General Motors; Governor Harold G. Hoffman of New Jersey; Dr. Miller McClintock of Harvard; Col. H. Norman Schwarzkopf of the New Jersey State Police; Col. Harold Fowler, First Deputy Commissioner of Police, New York; and many others.

The Paper and Pulp Section of the National Safety Council will have its headquarters at the Brown Hotel and will carry out an interesting program during the convention. The following papers will be presented by representative members of the industry:

"Report of Accident Experience Exchange," by A. E. Winslow, personnel directory, Hollingsworth & Whitney Co., Waterville, Me.; "Accident Prevention in Our Industry in Ontario," by D. B. Chant, secretary-engineer of the Ontario Pulp and Pulp Makers' Safety Association, Toronto, Ont.; "Guarding Paper Mill Machinery," by M. W. Dundore, production manager of Beloit Iron Works, Beloit, Wis.; "Hazards in the Tissue Industry and Their Elimination," by W. J. Peacock, personnel director, Northern Paper Mills, Green Bay, Wis.; "The Psychology of Safety from the Management's Viewpoint," by J. M. Conway, president of Hoberg Paper and Fibre Company, Green Bay Wis.; and "Paper Mill Maintenance and Repair," by Clyde Ferrell, superintendent of maintenance, the Mead Corporation, Chillicothe, Ohio.

An open forum on paper and pulp mill safety problems will also be conducted, with J. J. Plzak, safety director of the Consolidated Water Power and Paper Company, Wisconsin Rapids, Wis., as conference leader.

Consider Specialty Paper Agreement

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., October 2, 1935—While officials of the Federal Trade Commission do not give out any information as to what they are doing with trade practice agreements until prepared to do so, it is understood on good authority that the expanding and specialty paper products industry have agreed amongst themselves as to what should be in their proposed trade agreement.

The agreement is said to be in Washington where it is being gone over by the board in charge of these agreements. When the agreement meets with approval, the board will recommend to the Commission that a general trade practice conference be held. This, when and if it is held, will be public. No date has yet been set for such a conference.

Swedish Newsprint Production Lower

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., October 2, 1935—Production of newsprint in Sweden during the month of June amounted to 17,223 metric tons as against 23,578 tons during the preceding month and 18,228 tons during June, 1934, according to a report from Acting Commercial Attache Osborne S. Watson, Stockholm. Exports of newsprint from Sweden during June, according to official statistics, amounted to 15,632 tons, an increase of only 257 tons over June of last year.

U. S. Newsprint Industry Losing Ground

[FROM OUR REGULAR CORRESPONDENT]

GLENS FALLS, N. Y., September 30, 1935—In an address here this week before members of the Chamber of Commerce, Harold Hinckley, sales manager of the St. Croix Paper Company of Boston, Mass., declared that if the newsprint industry during the next ten years declines as it has for the past several years it will spell ruin for the industry in this country. He pointed out that this country has lost an enormous volume of business to foreign mills and is still losing it. He said that a helpful attitude in Washington would be appreciated but up to now such an attitude has been lacking. In the early days of the NRA the newsprint industry spent much time and expense in responding to the administration's request for code cooperation, he said, but unfortunately all of the cooperation was on the part of the industry, none being shown by the government. He also asserted that a prominent government official had made a statement to the effect that the newsprint industry was decadent and not worth saving while he maintains that it is worth saving.

In support of his contention, Mr. Hinckley presented statistics showing there are 500 paper mills of all kinds in this country, more than 1,000 paper-making machines, and more than 100,000 men directly employed in the mills during 1934. It is his belief that the industry represents an investment of hundreds of millions of dollars and newsprint is the foundation of the whole industry. There were in operation in 1910, or built between 1910 and 1934, a total of 98 mills designed primarily for newsprint production, according to the speaker. Today only 18 are wholly engaged in making newsprint, 27 devote part time, 34 have shifted completely to other grades, 13 were idle in 1934 and six have been destroyed or dismantled, he said. He pointed out that twenty years ago this state was the largest newsprint producer in the nation with 28 mills in 22 places while today only three mills remain with a comparatively small output.

It is his belief that the newsprint industry in this state is threatened by projected developments in Georgia and Alabama.

Large Response on Brown Co. Bonds

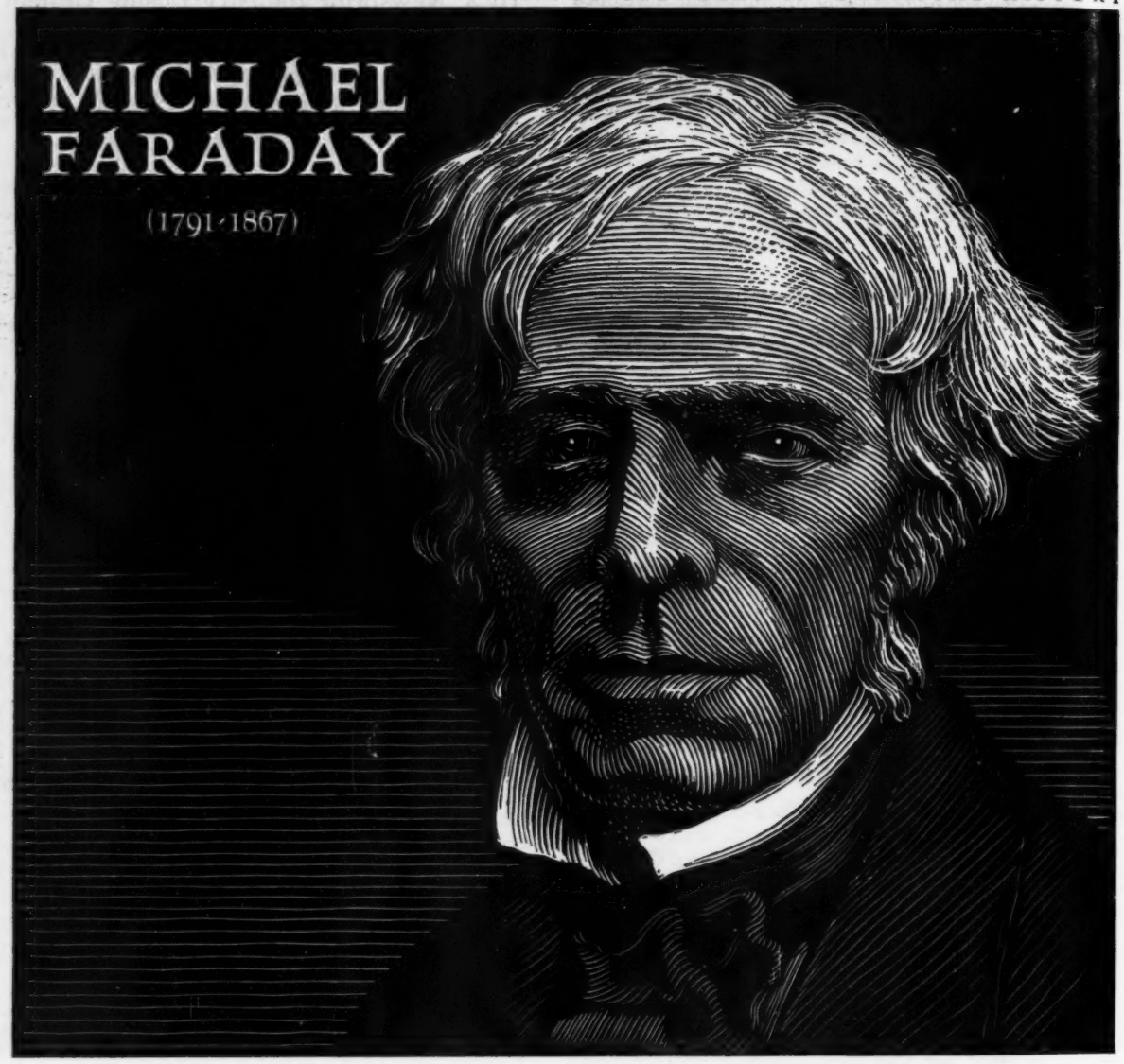
[FROM OUR REGULAR CORRESPONDENT]

PORTLAND, Me., September 30, 1935—While only a brief time has elapsed since the formation of the bond-holders' committee of the Brown Company, over 1500 owners of more than $6,000,000 of bonds have responded to the committee's letters.

Large holdings of bonds are directly represented on the bondholders' committee. Charles Francis Adams, chairman, represents the trust holdings of the Union Trust Company. He is also former treasurer of Harvard College, which also owns a substantial block of the bonds. Serge Semenenko, vice-chairman of the committee, represents a substantial block held by the First National Bank of Boston of which he is vice-president, it being understood that the First National Bank has no bank loans to the Brown Company.

The holdings of Dartmouth College are represented by President Hopkins as a member of the committee. Robert Braun, who is a member of the committee, is conservator of the Fidelity Trust Company in Portland and is also vice-president of the Maine Savings Bank, which is one of the largest holders of the bonds among the savings banks in Maine. The insurance interests are represented by Lee P. Stack of the John Hancock Mutual Life Insurance Company, which also owns a block of the bonds.

NUMBER TWO OF A SERIES OF FAMOUS PIONEERS IN CHEMICAL HISTORY



MICHAEL FARADAY, best known for his pioneer work in experimental electricity, was also a pioneer in the liquefaction of gases, notably chlorine. Thus, early in the 19th century, he laid the groundwork both for the modern electrolytic manufacture of chlorine and for present-day methods of chlorine distribution. Nearly a hundred years passed, however, before liquid chlorine came into its own as an important industrial commodity. Mathieson, first to manufacture chlorine products in the United States, has always been in the forefront of new developments in the production, distribution and efficient application of liquid chlorine.

The MATHIESON ALKALI WORKS (*Inc.*), 60 East 42nd St., New York, N.Y.

On March 5, 1823, a visiting scientist at the Royal Institution, London, criticized Michael Faraday for using soiled glassware in his experiments with chlorine hydrate. The next day the visitor received a note from Faraday reading: "Dear Sir: The oil you noticed yesterday turned out to be liquid chlorine. Yours faithfully, Michael Faraday."

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Section of the
Technical Association of the Pulp and Paper Industry
Edited by Ronald G. Macdonald, Secretary

The Determination of Water Vapor Permeability of Cellulose Wrapping Materials

By W. H. Charch[1] and A. G. Scroggie[1]

I. Introduction

The packaging of many modern foodstuffs demands a wrapper of very low permeability to moisture. To meet such requirements, manufacturers during recent years have made marked progress in the improvement of the moisture-proof qualities of their respective wrapping materials. Thus there are now on the market a number of common wrapping materials such as moistureproof cellulose film, certain waxed glassine papers, and other coated products which offer a degree of protection against moisture which was not to be found among any of the more common wrappers a few years ago.

The advent of this class of moistureproof wrapper has presented certain new problems with regard to a simple, yet accurate and dependable test for determining moisture permeability. The authors of this paper have been faced with such problems in connection with manufacture and research relating to moistureproof Cellophane[2] and have sought to evolve a test method for the accurate determination of moisture permeability of Cellophane and other highly moistureproof wrappers.

The method and apparatus described below have been in practical use for a number of years in our laboratories and have been used for plant control as well as research purposes. During this period, many variations in technique and apparatus have been studied and evaluated. The effect of some of the more important of these is discussed, as well as the effect of those properties of the wrapper which must be taken into consideration in interpreting or conducting the test. The discussion is largely built around the testing of moistureproof Cellophane as a typical wrapper through which the rate of passage of moisture is very low. In such cases, the effect of relatively small errors or differences in procedure, may result in a relatively large difference in the final value because of the small amount of vapor transmitted.

For wrapping materials which pass moisture at a relatively high rate, the effect of many items set forth below will obviously be less pronounced or in some cases negligible, depending upon the specific character and order of permeability shown by the wrapper being tested. However, a method designed for use on the most highly moistureproof wrappers should give even more accurate results when used with wrappers exhibiting a high rate of moisture transmission.

The expressions "impermeability to moisture," "moisture resistance," "moistureproof" and the like, are used here to designate that property of a sheet or film by virtue of which it resists the transmission of water *vapor* from one side to the other when there is a (moisture) vapor pressure differential exerted on opposite surfaces of the sheet. These terms carry the concept of passage of moisture *through* the membrane without reference to the physical mechanism of its passage; that is, whether it passed by means of solution in the membrane or through pores or holes. They are used to describe the phenomenon of moisture or water *vapor transmission* only, as opposed to transmission of liquid water as such. Furthermore, we exclude from the meaning of these terms any secondary effects on the membrane by moisture or water, such as spotting, softening, chemical changes, et cetera.

"Moisture permeability" is measured and expressed as the weight of water vapor which passes from one side of a sheet or membrane to the other, per unit of area, per unit of time, at some fixed temperature and when some chosen vapor pressure differential (hereinafter abbreviated to V. P. D.) exists at the two surfaces of the sheet.

In our opinion, an "ideal" test would be assembled and run at room temperatures using a saturated salt solution. The test should last for a sufficient time to get a reliable answer, possibly a week on very good material. Practically, we find it desirable to accelerate the test in order to save time and equipment, and to increase its severity in order that we may be informed of the behavior of our product under more adverse conditions.

We, therefore, propose to describe the permeability test as it has been run in our laboratories and, subsequently to discuss the factors influencing its accuracy. The discussion includes a description of the special thermostat developed for this work in our laboratories.

II. Description of the Test

A. Principle

The test is based on the exposure of a small dish containing water, and sealed tightly with the membrane to be tested, to a practically dry atmosphere for a period of 24 to 30 hours at a constant temperature. The dish is weighed

[1] Chemical Laboratories of the DuPont Cellophane Company, Inc., Buffalo, New York.
[2] The registered trade mark of the Du Pont Cellophane Company, Inc.

before and after this exposure and the loss in weight calculated to a standard basis for comparison.

B. Apparatus

1. Large thermostat or constant temperature oven, described below. This oven must be capable of regulation within the maximum limits of ± 0.5 deg. C. from any selected temperature, and capable of maintaining a relative humidity below 2 percent.

2. Glass crystallizing dishes—"Tanners Special," 70 mm. outside diameter and 50 mm. deep. A rough ground rather than a fire polished edge is preferred on these dishes.

3. Porcelain crucibles, No. 0, 15 cc. capacity, height 27 mm. One crucible is required for each crystallizing dish.[3]

4. Small bath of molten unbleached beeswax to be used for sealing samples to dishes.

5. Counterpoise. A test dish permanently closed by sealing on a cover of thin aluminum.

6. Sheet of rubber gasket stock.

7. Pound weights of lead or iron.

8. Supply of *heavy paper* or chipboard.

9. Pipettes, capacity 15 cc.

10. Analytical Balance, chainomatic type.

C. Procedure

See that the oven meets the standard conditions of temperature and relative humidity.

Heat a sufficient amount of wax to a temperature of 140 to 160 deg. C.

Cut a sample out of the sheet to be tested, approximately 4 inches square.

To make the seal, lay the sample on one or more layers of paper on the gasket rubber. On the center of the sample place a small square of paper or chipboard. On the piece of paper place a crucible containing 12 ml. to 15 cc. of distilled water at a temperature of 45 to 55 deg. C. The temperature should be adjusted to produce a test dish on which the Cellophane surface is flat, not puffed, while in the oven *during the test.*

Invert the dish and dip it to a depth of about 0.5 inch in the molten wax. Allow it to remain with the edge immersed for a few seconds. Gentle rotation with a portion of the edge lifted momentarily during this period will relieve the air pressure and prevent spattering when the dish is removed from the wax. Remove the dish from the wax, allow some of the surplus wax to run off, and holding it level, place it on the sample so that the crucible is enclosed under the test dish. Avoid shifting the dish on the sample before the wax hardens. Place a pound weight on the test dish to hold it firmly in place until the wax solidifies, which requires about 60 seconds.

Remove the weight, lift the dish vertically, and invert it with a sharp flip. When correctly carried out, this will not splash water on the sample. The water should be outside the crucible on the bottom of the test dish. If the water remains under the crucible, swirl the dish to release the water. *Cut* the Cellophane sheet with scissors to leave a rim of about 0.25 inch around the outside edge of the dish. Press this down gently with the fingers before the wax is fully hardened.

Allow the dish to *cool to room temperature* (20 minutes), then weigh it to 0.001 gram and place it in the oven for 24 hours, plus or minus 10 minutes. During all weighings of permeability dishes the counterpoise must be on the right hand balance pan. Dishes should be placed in the oven as soon as practicable after weighing has been completed. In no case should they be allowed to stand in the laboratory for more than one hour.

When the weighings are not being made, keep the counterpoise in a covered container to avoid accumulation of dust, etc. Check the weight of the counterpoise occasionally. The variation in weight from one check to another will not be more than 2 to 3 mg. unless violent barometric changes have taken place. Any greater variation indicates some variation in the balance, weights, or weighing technique.

At the end of the standard period, remove the sample from the oven, *cool to room temperature,* and weigh to 0.001 gram. Cooling requires about 15 minutes; weighing should start in less than 30 minutes. The difference between the initial and the final weight is considered the moisture lost through the sample. Calculate the permeability of the sample.

Calculation

$$\frac{\text{Observed Loss in Mgs.} \times 1{,}000{,}000}{1000 \times (\text{Time in hours}) \times (\text{Area exposed in sq. cm.})} = \text{Permeability in grams per 100 square meters per hour.}$$

For standard glass dishes and a 24-hour test: 1.3 × Observed loss in mg. = Permeability, as above.

Report the permeability. Record the temperature, the relative humidity of air in equilibrium with the solution in the test dish at this temperature, and the relative humidity of the air inside the oven, together with the corresponding V. P. D.

In our standard test we use a temperature of 39.5 ± 0.5 deg. C., approximately 100 percent r. h. inside the test dish, and approximately 1 percent r. h. in the oven, equivalent to a 53 mm. V. P. D.

III. Discussion of Factors Influencing the Test

A. The Choice of Temperature and Humidity Conditions to be Used in Testing

1. General Considerations

We have found that permeability is not always directly proportional to V. P. D., particularly at the higher relative humidities. When conditions under which the product is to be used commercially are particularly severe, it is, therefore, desirable to choose test conditions of temperature and relative humidity comparable with those encountered by the wrapper in practical use.

In choosing the particular temperature and humidity (which determine V. P. D.) under which to measure the moisture permeability of a sheet, there is obviously considerable latitude. Different workers have chosen different conditions, depending on their purposes. Transparent moistureproof cellulose sheets and the translucent glassine papers of the moistureproof varieties are used over a wide variety of articles and throughout very broad geographical areas, representing a similarly wide range of temperature and humidity conditions. Dry articles such as crackers should be kept crisp in very damp climates, while cigars should be packaged to retain their moisture in the indoor dry winter air of the north. Actual commercial extremes which a satisfactory wrapper must meet, range from well under 10 percent relative humidity on the inside of certain dry packages, up to practically 100 perecent r. h. in other cases, and this at all temperatures from under 0 deg. F. up to 100 deg. F. (38 deg. C.) Furthermore, it is usually these extremes rather than average conditions, that create special problems or make special demands upon the wrapper. Thus, in order to cover such conditions in a generally applicable test for moisture permeability without the necessity for correlating data obtained under less drastic conditions, we conduct direct tests at a temperature of

[3] Glass dishes and crucibles are listed because they are readily obtained; in most of our work we use aluminum 2S alloy, extruded flanged cans and aluminum crucibles, both made to special order.

39.5 deg. C. (103 deg. F.) with practically saturated air on one side of the sheet and practically dry air on the other, approaching as nearly as possible a relative humidity differential of 100 percent (actually 97 to 98 percent).

It may be argued that this set of conditions is too drastic for many purposes. In such cases, this point is conceded, but the manufacturer of the wrapper itself must comprehend such a broad range and test accordingly. In the case of Cellophane, for instance, with its diversified uses and almost world-wide geographical distribution, the manufacturer has practically no control over these conditions, and we have thus adopted testing conditions that include the extremes. The same point of view applies to many of the waxed wrappers, as well as other materials of wide distribution. Finally, packaging problems are demanding wrappers which will stand even greater extremes of temperature, rougher usage, and longer life than will present day commercial materials. Where conditions of use are known to be more narrowly circumscribed, and less drastic, less severe tests giving information more closely related to a particular problem can be carried out with a lower V. P. D. (lower relative humidity and/or lower temperature).

2. Practical Upper Limit of Temperature

There is a practical upper limit to the testing temperature because when the temperature of testing is too high, it may be effective in breaking down the moisture-proof protection. Most coated wrapping materials used commercially at present contain paraffins melting between 50 and 60 deg. C. At temperatures approaching the melting or softening point of the wax, the coating undergoes a physical change such that very little resistance to the passage of water vapor is offered. This lowering of resistance is gradual, as shown in the attached curve, (Fig. 1), which is typical of moistureproof Cellophane. In this case it is to be noted that the passage of moisture at a greatly increased rate takes place only at temperatures above those commonly encountered, (above 110 deg. F.). Different wrappers embodying different waxes or coating compositions will, of course, show different characteristic curves. With low melting waxes the break point occurs at distinctly lower temperatures than in cases where high melting waxes are used, while the effects of other ingredients of the coating composition may play their part in determining the shape of the curve obtained for any given wrapper.

Another factor limiting the temperature of the test is the tendency to generate a sufficiently high pressure inside the test unit to cause considerable difficulty in keeping the dishes sealed perfectly during their time of exposure in the oven.

B. Influence of Variations from Standard Temperature During a Test

1. Effect of Condensation

When tests are carried out in an atmosphere of 100 percent relative humidity on one side of the sample, variations in temperature during the test are extremely important because slight variations (greater than ± 0.5 deg. C.) will cause the deposition of water on the film surface in contact with the high humidity. This has the effect of converting the test from a moisture vapor penetration test to one which may be influenced by the presence of liquid water in addition to water in the vapor phase. The presence of substantial quantities of water may cause a degradation of the film resulting in exaggerated penetration. Under such conditions, the test is not a true reflection of the value of the coating for industrial uses where the film is not subjected to the action of liquid water. In most of the practical uses for moistureproof wrappers, as on baked goods, tobacco, candy, etc., the moisture content of the article wrapped is not sufficiently high to develop any such condensation on the inside of the package as results from carrying out the herein described test under variable temperature control, and we have, therefore, gone to considerable effort to develop in this test a constant temperature oven specially adapted to keep temperature variations within a range which minimizes condensation on the sheets being tested. (See Section C-1).

Where conditions do not appear to warrant the time and expense entailed in providing a large oven space under sufficiently close control to eliminate or minimize condensation when water is used in the dish, or when for deliberate reasons in testing a relative humidity less than 97 to 98 percent is desired, we recommend that general tests be carried out with saturated salt solutions. A saturated sodium chloride solution is recommended as giving a moderately high relative humidity, namely 75 percent, which does not change appreciably with normal temperature variations. Such tests are less subject to errors caused by temperature variations and are more readily duplicated. Depending upon the use to which the wrapper is being put, they may reflect more nearly the industrial value of the wrapper in this use. This subject is discussed further at the end of this paper.

2. Effect on V. P. D.

In addition to causing condensation as just described, changes in temperature cause changes in V. P. D. with resulting changes in permeability. The change in V. P. D. is not uniform for unit changes in temperature so that a slight variation of plus or minus 1 deg. C. does not have the same effect at all parts of the temperature scale. The magnitude of these changes is indicated in the data recorded in Table I.

TABLE I.—VARIATION IN VAPOR PRESSURE OF WATER WITH TEMPERATURE

	30 deg. C.		40 deg. C.	
Standard Temperature.....				
Standard V.P.D.....	31.82		55.32	
Change in V.P.D.....	Minus	Plus	Minus	Plus
1 deg.	30.04	33.70	52.44	58.34
2 deg.	28.35	35.66	49.69	61.50
Avg. Change in per cent....	5.5%	6.1%	5.2%	5.6%

(Data from Int. Critical Tables, Vol. III, p. 212)

It is apparent that the theoretical change in V. D. D. and in permeability is about 6 percent per degree when the standard temperature is 30 degrees, and about 5 percent per degree when the standard temperature is 40 deg. C. Our experimental data indicate that the percentage change in permeability per degree centigrade in the neighborhood of 40 deg. C. approximates the calculated value. This is apparent from inspection of the lower portion of

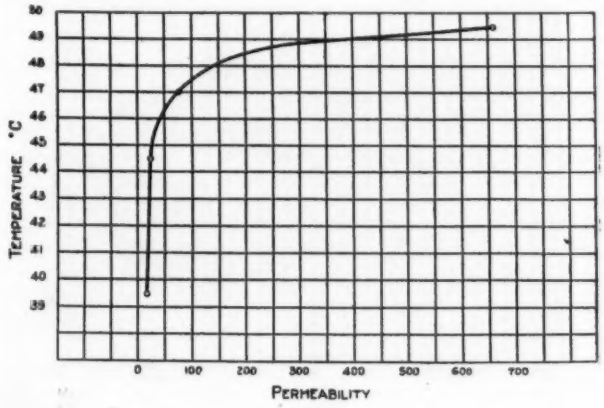

FIG. 1

the curve showing variations in permeability corresponding to variations in the temperature of the test, (Fig. 1).

C. Testing Equipment

1. Oven or Thermostat

We have mentioned above, the importance of uniformity of temperature during the test and the lack of suitable themostats or ovens for this purpose.

To our knowledge, no constant temperature oven or themostat of sufficient size capable of a controlled humidity and with the necessary temperature precision is available on the market at a reasonable cost. We shall, therefore, describe such a unit which has been built at a cost of about $700 and with a capacity for over 500 test dishes. This oven will hold a given temperature constant within plus or minus 0.2 deg. C. at any one point and maintain an atmosphere of less than 2 percent r. h. over periods of days.

The oven proper, approximately 7½ feet long and 3 feet by 3 feet in section, is constructed of "Cemesto Board" on a welded framework of aluminum angle forms and bound with ⅛ inch welded aluminum strips. Cemesto Board is a commercial building material consisting of a one-inch thick layer of "Celotex" with a ¼ inch thick sheet of "Transite" on both sides. All seams were well coated with an organic cement before fitting together to insure air-tightness.

The oven is divided into a large and a small compartment, both having inside glass doors and an outside door, as shown in the accompanying diagram and photograph (Plate I and Fig. II). The right-hand compartment is for the test samples (capacity over 500 dishes on the five shelves); the left-hand compartment houses the fan (C), heater (D), and dehumidifying equipment (DE). The inside glass doors permit examination of the samples and reading of temperatures without opening the compartment. Both doors are weatherstripped to prevent air leakage either in or out.

Air is circulated by a No. 3 Buffalo Forge Company's baby conoidal fan rotor running at 1725 r. p. m., and delivering approximately 300 cubic feet of air per minute giving a linear velocity of approximately 100 feet per minute over the sample. The air is taken from the discharge side of the fan through ducts the width of the oven running at the top and bottom to the opposite end of the oven, where it is fed into the testing compartment through slots. These slots are adjustable and are regulated by trial to allow the same amount of air to pass into each shelf. After passing over the samples, the air is discharged through slots at the other end into the conditioning compartment, first passing over concentrated sulfuric acid to take out the moisture, then through the heating coils and finally picked up again by the fan suction.

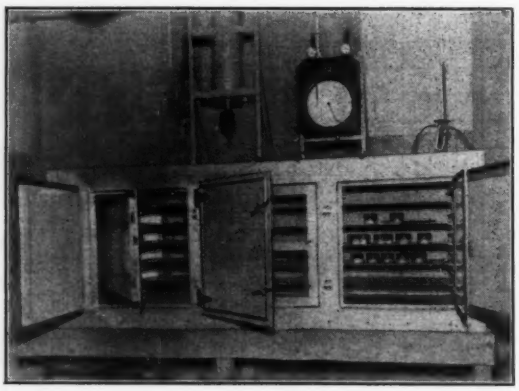

Plate 1
Photograph of constant temperature dry oven for permeability test dishes.

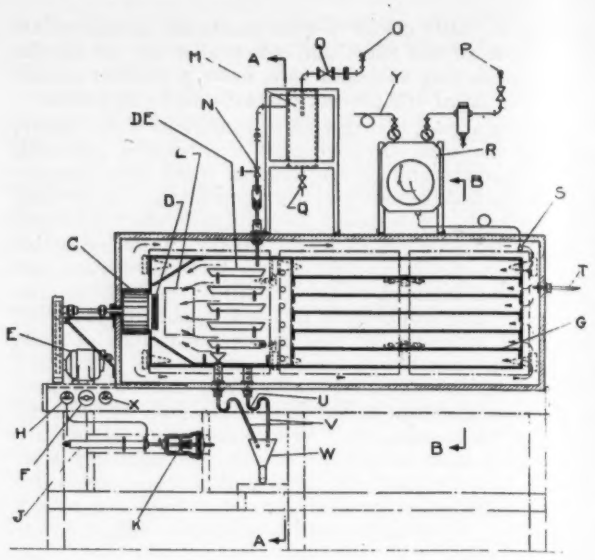

Fig. 2
AA—Section line for Fig. 2-A. BB—Section line for Fig. 2-B. C—No. 3 baby conoidal fan with inverted hub, 1725 r.p.m. D—Heat control coils: 1-300 watt, 110 v.; 1-600 watt booster. E—¼ h.p. motor, 110 v.—single phase. DE—Dehumidifying equipment. F—Main switch. G—3 outside doors, ¾-inch Transite. H—3 heat control switch, 300 w, 400 w and 500 w taps. J—"Allen-Bradley" rheostat, type B-410, size No. 5, 375 watts. K—Taylor "Evenaction" valve motor, size 1M. L—Sliding door, near side. M—Sediment chamber. N—¼-inch Lunkenheimer stainless steel needle valve. O—Acid supply, 1-inch X.H. iron pipe, conc. H_2SO_4. P—25 pounds air supply. Q—½-inch Merco-Nordstrom plug cock. R—Taylor recorder-regulator No. 15502; temperature range 60 —130 deg. F.; chart No. 2800, with plain air temperature bulb. S—Control bulb. T—Indicating thermometer, 0-100 deg. C. U—Seal overflow pan drain. V—Glass tubing. W—Lead funnel. X—Booster switch. Y—To "Allen-Bradley" rheostat.

The dehumidifying unit (DE) consists of a series of glass photographic trays arranged, as shown in Figs. 2 and 2-A in two stacks. Concentrated sulfuric acid (sp. gr. 1.84) is introduced through glass wool filters in the top of the oven to the top tray in each stack. Each tray is equipped with a ⅜ inch ground in glass nipple in one corner to allow the acid to overflow to the next lower tray. The trays are so arranged that the acid must traverse the tray before running out. The acid from the last tray is discharged into a funnel which is connected to a reverse bend tube and thence to the sewer. The reverse bend tube effects a seal to prevent air entering the oven. For safety purposes, there is a large lead tray, with a separate overflow to the sewer, under the glass trays to catch any acid that may be spilled or overflow accidentally. A continuous stream of water runs in the sewer outlet to dilute and wash away the effluent acid.

The control heating unit consists of a 300 watt "Nichrome" coil tapped at 400 and 500 watts and controlled by a three-circuit snap switch. This coil is mounted on a "Transite" panel with screws and stretched transversely across the air stream in the fan suction opening. A 300 watt coil of this size is sufficient to maintain the oven at 40 deg. C. when located in a room at 20 to 25 deg. C. A second coil of 600 watts is also mounted in the same place and used to bring the oven up to temperature rapidly after it has been out of service. A cooling coil is also provided for use when necessary during the summer. (Not shown.)

Perhaps the most distinctive feature of this oven is the arrangement for controlling the temperature. There are two essentials to accurate temperature control: (1) rapid response of the thermal element; and (2) some device for *continuously* supplying sufficient heat to maintain the de-

sired temperature. Since we wished a record of the oven temperature, and a supply of air at constant pressure was available, the thermal controlling device selected for this oven was a Taylor Instrument Company industrial "Fulscope" recorder regulator No. 15502. The thermal element in this vapor actuated instrument is a capillary tube 0.068" o. d. and 50 feet long, which is very sensitive to minute changes in temperature. The bulb is located at (S), Figure II, in the top supply duct just before the air enters the testing chamber, where the air has a relatively high velocity insuring rapid response of the instrument. The air from the recorder regulator is connected to a Taylor No. 1M "Evenaction" diaphragm motor (K) which actuates an Allen-Bradley, Size No. 5, carbon pile rheostat (J) connected in series with the heating coil. In actual operation the recorder regulator "throttles" at a point where the input heat is in equilibrium with that radiated. The air pressure on the diaphragm valve should vary from 10 to 15 pounds. To secure this equilibrium, it is necessary to use a heating coil of such capacity that the coil is never cut out completely but merely regulated.

As a further check on temperature, calibrated glass stem thermometers are placed on each shelf in the testing compartment. These thermometers are read at the beginning and end of each test. Over a period of months, the temperatures in the various parts of the oven have been found to check within plus or minus 0.5 deg. C. The effluent sulfuric acid from the dehumidifying chamber is titrated daily and the acid flow maintained at a point where the spent acid is between 80 and 85 percent sulfuric acid. With this acid concentration, a relative humidity of well under 3 percent is readily obtained. The true relative humidity is determined periodically by weighing the moisture absorbed from a known volume of air.

2. Method of Sealing Samples to the Test Dish

For our purposes the sample and dish must be capable of quick assembly, and to conserve oven space the overall

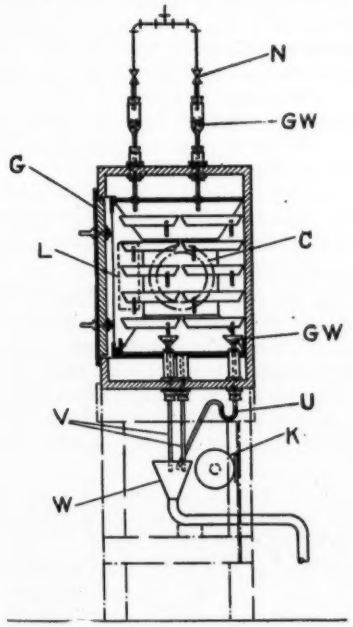

FIG. 2-A

C—Baby conoidal fan with inverted hub, 1725 r.p.m. G—3 outside doors, ¾-inch Transité. GW—Glass wool. K—Taylor "Evenaction" valve motor, size 1M. L—Sliding door, near side. N—¼-inch Lunkenheimer stainless steel needle valve. U—Seal overflow pan drain. V—Glass tubing. W—Lead funnel.

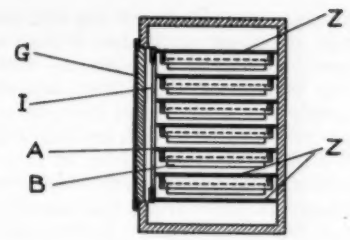

FIG. 2-B

A—5 removable shelves, ¼-inch Transite. B—Adjustable slots, each end of shelf. G—3 outside doors, ¾-inch. Transite, 1¼-inch Cemestoboard, ⅛-inch felt gasket. I—3 inside doors, glass. Z—¾-inch Transite top and bottoms.

dimensions of the test unit should not be much greater than the available sample area. In any case, it is indispensible that the seals be absolutely vapor-proof under test conditions and finally, the unit must be easy to weigh.

We have experimented with a large number of mechanical seals made by compressing the film between lapped metal surfaces and between various types of rubber gaskets backed by metal, applying the pressure both by screwing down a ring on the sample, as in closing a fruit jar, or by clamping a ring with a number of "C" type clamps. We have also tried the use of screws.

Seals of this mechanical type have the special merit that the effective area being tested is defined accurately. On the other hand, the seals as a rule are not vapor-proof under conditions which result in a high V. P. D. between the two surfaces of the film. This defect is, of course, fatal, whatever may be their advantage in other respects. We have found, for instance, that when Cellophane is sealed between two lapped metal surfaces where the annular members enclose an area having a diameter of 3 to 4 inches, at least 12 clamps are necessary to eliminate leakage effectively with a V. P. D. of 50 mm. The total weight of such an assembly is far too great to be handled on an ordinary analytical balance. Moreover, it requires a great deal of room in the oven, and considerable time to prepare a single dish.

We have found the Thwing Vapometer to be unsatisfactory from this standpoint of leakage, in that we have obtained appreciable losses through the seals when testing with high V. P. D. Experimental data are given below in Table II. The losses include loss through the seal and edge loss through moistureproof Cellophane films.

TABLE II
LOSS WITH THWING VAPOMETER (Note 1)

Temperature Deg. C.	Relative Humidity Per cent	Corresponding V.P.D. mm. Hg.	Time (Hours)	Loss Mg./Hr.
24	50	9	50	1
39.5	95	53	18	2.1
50	95	87	40	27 (Note 2)

Note 1. The Vapometers were purchased from the Thwing Instrument Company, Philadelphia, in 1932. We understand an improved model will be on the market shortly.

Note 2. In the last of the tests listed above, the vapometer was waxed inside to minimize losses between the outside dish and the fitted internal ring.

The general clumsiness and actual loss through the seals experienced in all types of mechanically sealed dishes which we could buy or devise, has caused us to abandon this method of sealing in favor of the wax seal.

We test metal seals by placing a piece of shim brass over the test sample before clamping in the usual manner. The Thwing Vapometer was tested by fabricating a special cover from sheet aluminum which would replace the upper ring supplied with the original Vapometer.

Wax seals can be applied rapidly to light thin-walled

dishes and the loss obtained through the seal ranges from 0 to a maximum of 0.5 mg. in 24 hours with a V. P. D. of 50 mm. of mercury. Wax seals are not subject to any of the criticisms mentioned above for mechanical seals. On the other hand, wax seals do not define accurately the test area, which will vary from dish to dish depending on the amount of wax used. In practice we find the variation with experienced operators is very small and where a number of replicate samples are being run the total area will always show the same average in a number of tests. The actual area can be determined by the use of a planimeter or by counting cross section paper through the exposed area. The use of wax seals involves some precautions discussed subsequently.

While we have tried a variety of waxes, we find unbleached commercial beeswax to be best, though some brands require the addition of a little gum damar to improve their adhesive quality.

We test wax seals by sealing a test dish to a glass plate.

Wax seals of the type described, and most mechanical seals permit a certain amount of moisture to pass out of the edge of the test sample, as distinct from passage directly between opposite surfaces of definite area. This is termed edge loss. The error (2 to 3 permeability units as described elsewhere) is significant only on highly impermeable samples and is within experimental error on most materials. It can be eliminated by painting the edge of the sample with wax.

3. *Other Testing Equipment*

In addition to crucibles of 2S aluminum alloy and porcelain, we have used small paper cups or cups made by shaping heavy tin foil. (The latter must be free from pinholes.) Neither of these alternative materials appeared to affect the test in any way.

We have used other vessels made of cast aluminum which developed an amount of gas during the test. This gave trouble but the material can be used after waxing all over inside.

It is important that all dishes be of the same height and the same quantity of water be added, since the permeability varies with the distance between the membrane and the water surface. The relative effect of variation in this distance is indicated in Table III:

D. Duration of the Test

The following specific influences must be considered:

The test must be long enough (a) to give a representative result, and (b) to be free from appreciable error caused by abnormal initial permeability. At the same time

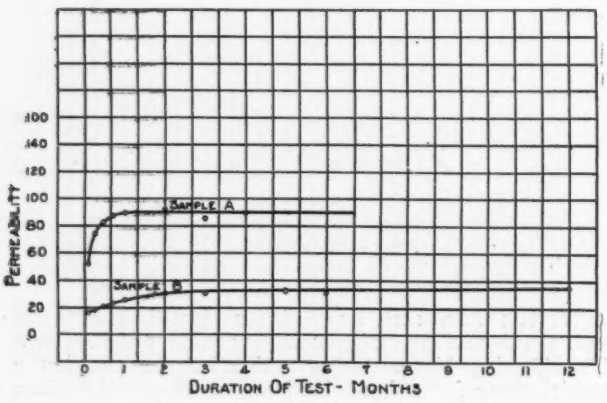

Fig. 3

TABLE III
AVERAGE PERMEABILITY OF M.T. "CELLOPHANE" VS. DISH HEIGHT

Height of Dish	Permeability at 39.5 deg. C. Per cent of 5 cm. dish	Permeability 10 Per cent Salt Solution at 43 deg. Per cent of 5 cm. dish
1 cm.	141	137
2 cm.	119	115
3 cm.	109	105
4 cm.	103	102
5 cm.	100	100

the test must be as short as practical in order (a) to conserve laboratory equipment and personnel, (b) to produce results without undue delay (hold-up of stock), and (c), to avoid organic changes in the sample being tested.

For the test conditions outlined above, we have found the rate of loss obtained in 24 hours to be measurable and to be practically equal to the rates of loss obtained when the test is run for longer periods. Data are given in Table IV. We regard a 24-hour test as being short enough for practical consideration.

TABLE IV
VARIATION IN PERMEABILITY OF "CELLOPHANE" WITH DURATION OF TEST

Time hours	Sample 1 Avg.	Sample 2 Avg.	Sample 3 Avg.	Sample 4 Avg.
16	14	15	ii	ii
24	16	13	13	39
48	12	13	12	42

Ten to twenty tests were run on each sample for each time period to obtain the above figures.

As mentioned above, the test must not last long enough to cause a change in properties of the material being tested. This applies particularly to non-homogeneous film where the water vapor condensed during the test may effect a physical change in the test film. For tests conducted at approximately 100 percent relative humidity with temperature controlled sufficiently to prevent appreciable condensation, the test should last not more than two days. As the relative humidity of the test is lowered, the testing period may be extended indefinitely if desired. For instance, we have run a test on moistureproof Cellophane using saturated sodium chloride solutions inside the dish (r. h. 75 percent), which corresponded under the temperature used (39.5 deg. C.) to a V. P. D. of approximately 40 mm. of mercury. This test was run until the seals broke or the water was exhausted, which required seven months for one sample, and about fifteen months for another. During this period the permeability increased two- or three-fold, no more; the major increase taking place by the end of the first month. (See Fig. 3.)

E. Unit of Permeability

It is desirable to express permeability in some simple unit which would be readily understood and easily duplicated, such as unit moisture transmitted (loss of weight), per unit area, per unit time, per unit vapor pressure difference. As suitable units we naturally think in terms of the gram, the square centimeter, and the hour or day, and a millimeter of mercury as the unit of vapor pressure difference.

Since it is convenient to run a test for an even number of hours which may be equivalent to a fraction of a day, we chose an hour as the unit of time.

It is not possible to test more than a few hundred sq. cm. of film at one time, but good commercial material passes such a small amount of vapor in ordinary testing conditions, that the sq. cm. units of area are not practical. To avoid very small decimal fractions, it is necessary to choose a large area or multiply by some arbitrary factor. We have chosen to calculate our observed losses to a basis of a large area, 100 sq. m.

The discussion given elsewhere shows that permeability is not always directly related to V. P. D. so that calculation to unit vapor pressure difference is not justified in any method intended for general use on a wide variety of wrapping materials.

We have accordingly defined permeability in all our work as the grams lost per 100 sq. m. per hour at the temperature and V. P. D. used for the test. In the case of our standard test made with approximately 100 percent. r. h. differential at 39.5 deg. C., this becomes a 53 mm. permeability test at this temperature. Tests made with saturated sodium chloride solution under the above temperature condition are 40 mm. permeability tests at 39.5 deg. C.

For our purpose we consider as important only the moisture passing completely through the film. No allowance is made for vapor passing into the film from the side exposed to the higher relative humidity unless it also passes out on the low humidity side.

Some workers *(1)* have chosen to report the reciprocal of the permeability. We believe this is undesirable because the practice results in unequal weighing of values and they cannot be properly averaged.

F. Influence of Temperature Variation During Make-Up

1. Temperature of Wax

The temperature of the wax used for making seals is without definite influence on the final results. It must be hot enough to get a good seal, but not so hot that the operator's hands are affected. We commonly use temperatures ranging from 140 to 160 deg. C., but special tests have been made with temperatures ranging from 125 to 215 deg. C. without appreciable effects. For reasons given below, however, it is desirable to use the wax at some standard temperature so that conditions will be comparable from sample to sample.

It might be assumed that the high temperature of the wax would degrade the coating as discussed above in Section III-B-2. While this may take place, the film affected is covered with wax so that no vapor penetrates the part of the film which has been impaired.

2. Temperature Inside the Test Dish

The use of hot wax tends to warm the dish and the air and water, or solution in it, particularly after the crucible has been inverted. This has the effect of raising the vapor pressure above the equilibrium point so that as the test dish cools down, condensation of water vapor takes place on the under side of the sample.

A slight amount of condensation indicates that the air in the dish is saturated with vapor and while it is of value in this connection, a heavy condensation may cause degradation of the film as described above with reference to condensation during the test in the oven.

This effect can be avoided by using salt solution which practically eliminates condensation under normal conditions or the effect can be minimized by weighing the test unit as soon as cooled and placing it in the thermostat or oven immediately after weighing. Since the oven is usually maintained above room temperature, condensed moisture soon disappears.

3. Variation in Specific Gravity

The cooling of the dish after make-up results in the contraction of the air which sucks in the test film, forming a surface which is concave upwards. Since this is an air-tight vessel of definite weight and appreciable but variable bulk, its specific gravity changes and the buoyant effect of the air will vary with the degree to which the surface film is sucked in. The magnitude of this effect is as great as 3 or 4 mg. which may have an appreciable influence on tests made on good film.

It can be avoided by following a regular routine in making up tests; this is, make a few tests at a time; allow these to cool and then weigh them, placing them in the oven immediately. In this way all films are weighed with approximately the same degree of concavity. On removal from the oven they should be allowed to cool to the temperature corresponding to the same degree of concavity and then weighed.

4. Superficial Cooling

Cooling after make-up often results in some condensation of moisture on the outside surfaces of the dish if the samples are allowed to stand too long. This can be avoided by adopting the routine mentioned above. It can be lessened by working in an atmosphere of low relative humidity or by cooling the dishes in a desiccator or by wiping with a cloth before weighing, though occasionally this introduces undesirable electrical effects.

5. Tension on Test Samples

The stretching of the film which accompanies the cooling may open and magnify weak spots in the coating that are probably without significance in commercial use. This occurs before the test proper commences.

Note that when mechanical seals are used and the test samples placed in a thermostat at temperatures above make-up temperatures, this stretching effect takes place in the oven and is present during the whole of the test. In other words, cracks may be opened in the sample and held open during the period which is being used to measure the permeability of the sample.

G. Influence of Variations in Barometric Pressure

Dishes used in our test measure 70 mm. by 50 mm. and have a volume of approximately 193 cu. cm. The weight of the air which is displaced varies with its density which depends on relative humidity and barometric pressure. It can be shown by calculation that the weight of the air displaced is approximately 220 mg. with a variation of 2.5 mg. for a difference of 10 mm. of mercury in the barometric pressure, assuming a constant humidity of 35 percent r. h. Since variations of this order result in appreciable errors when testing good film, it is desirable to make all weighings with a counterpoise on the opposite balance pan. The counterpoise should displace as much air as the test unit and can be conveniently made by sealing a test dish to a piece of thin brass or aluminum. Extra wax may be used to insure a perfect seal. We have found it difficult to secure good seals when welding or soldering sheet metal to our standard aluminum dishes.

H. Influence of Variation in Air Velocity over the Test Samples

Abrams and Chilson *(2)* discussed this effect, pointing out that the air velocity could vary through a considerable range (from 200 to 600 feet per minute) without making any appreciable effect on the permeability. While we

have not duplicated their work, we have developed some other data to show that the permeability with a medium air stream is distinctly different from the permeability under stagnant conditions or under conditions where the air passes over the test samples at a high velocity. This effect is noted in Table V, which contains information developed when using a Freas No. 601 type oven.

TABLE V
VARIATION OF PERMEABILITY WITH CHANGE IN VELOCITY OF AIR OVER TEST DISH

Relative Air Speed	Permeability Test 1	Permeability Test 2
Stagnant air	23	26
Low speed	52	48
Medium speed	53	48
High speed	64	79

It is apparent that the test is not particularly sensitive to air speed, given a sufficient minimum flow of air. The point to be emphasized is that tests conducted in stagnant air such as exists in desiccators should not be compared with tests conducted in a moving air stream. In general, it is, of course, desirable to have test conditions including speed of the air over the test sample standardized as far as possible.

I. Influence of Vapor Pressure Differential

Water vapor pressure in air is determined by the prevailing temperature and the percentage relative humidity. When water or saturated salt solution is used inside the test dish, the vapor pressure exerted on the under side of the sample can be readily calculated or read from tables. The experimental determination of the relative humidity and temperature of the air in a thermostat gives the vapor pressure exerted on the opposite side of the test sample. Substracting these two values gives the approximate V. P. D. present during a particular test.

Low vapor pressure can be secured by lowering the temperature and maintaining 100 per cent r. h., or by maintaining the temperature and using a saturated salt solution as a test medium instead of water, to secure a lower relative humidity. At various times we have used

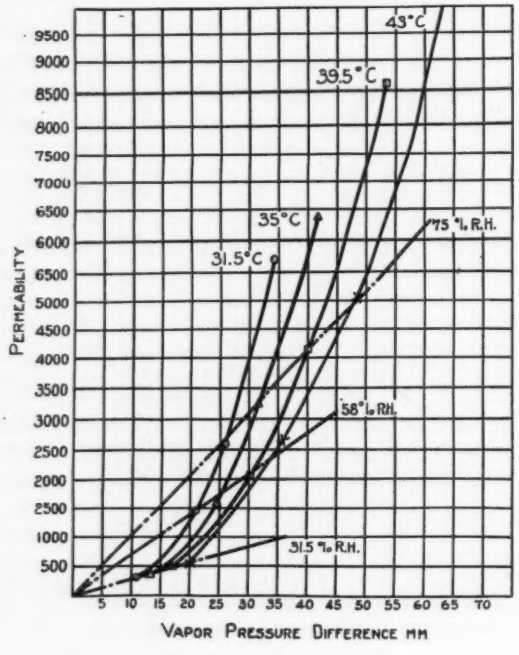

FIG. 4

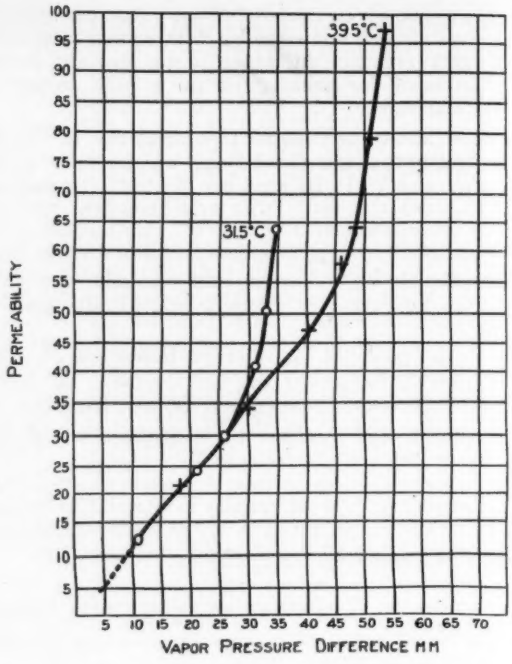

FIG. 5

saturated solutions of the salts given below and have calculated the relative humidities of air in equilibrium with the saturated solutions.

TABLE VI

Salt	Formula	Estimated Relative Humidity of Saturated Solution at 39.5 deg. C.
Magnesium chloride	$MgCl_2.6H_2O$	32%
Cobalt chloride	$CoCl_2$	58%
Ammonium nitrate	NH_4NO_3	60%
Sodium chloride	$NaCl$	75%
Ammonium sulphate	$(NH_4)_2SO_4$	81%
Ammonium dihydrogen phosphate	$(NH_4)H_2PO_4$	91%
Copper sulphate	$CuSO_4$	97%

(Calculated from data in the International Critical Tables, Vol. I, page 67.)

Abrams and Chilson *(2)* suggest that when other conditions are standard, the permeability of a given type of sheet is directly proportional to the V. P. D. existing during the test. While we have found this to be true under certain conditions, we have also found two important exceptions to the rule. We feel that the general statement is applicable only to materials which are reasonably impermeable and then only at a relative humidity well below saturation.

The properties of material having relatively high permeability are illustrated by Figure IV, showing the relationship between V. P. D. and permeability for plain Cellophane (not moistureproof). It is readily seen that when relative humidity is constant and temperature variable, the permeability is directly proportional to vapor pressure difference, but that when temperature is constant and relative humidity variable, permeability does not vary directly with differences in V. P. D.

It is believed that this difference in behavior can be explained on the assumption that the inside surface of the test film readily comes to equilibrium with the relative humidity of the air inside the test dish, and the amount of moisture passing through the film is determined by the value of this equilibrium water content which is dependent on relative humidity and not on water vapor pressure.

Fig. 5 shows the relationship at two temperatures between permeability and V. P. D. for moistureproof Cello-

phane, a relatively impermeable membrane. The data are set forth in Table VII.

TABLE VII

31.5 deg. C.			39.5 deg. C.		
V.P.D.	R.H.	P.V.	V.P.D.	R.H.	P.V.
11.0	31	12.5	17.0	31	21.5
21.0	61	24	30.0	56	34
25.5	75	30	40.0	75	47
~~30.0~~	~~87~~	~~35~~	46.0	86	58
31.0	91	~~51~~ 42	48.5	91	64
33.0	96	~~42~~ 51	51.0	97	79
34.5	100	~~76~~ 64	53.5	100	97

The three lower points on each of the curves represent comparable relative humidities at the two temperatures. Inspection of the curves reveals the following relationships: (1) In general, for conditions where relative humidity does not exceed 75 percent, permeability varies directly with V. P. D. for any working temperature; (2) when temperature is constant, permeability varies directly with V. P. D. for changes in relative humidity below 75 percent, but above this relative humidity, permeability increases faster than V. P. D.; (3) when relative humidity is constant, permeability varies directly with V. P. D. (or temperature). The ratio of permeability to V. P. D. is uniform for all relative humidities below 75 per cent, but above this value, the experimental evidence indicates that the ratio increases with increasing relative humidities.

It thus appears unsafe to try to reach a general conclusion concerning the relationship between permeability and vapor pressure difference which will be true for all sheet materials which of necessity differ in properties widely among themselves. It also appears undesirable to calculate the amount of moisture permeating a given membrane in a test to permeability per unit V. P. D.

These facts lead us to recommend that permeability tests are best carried out under conditions which coincide as closely as feasible with conditions under which the wrapping material is to be employed. Whenever it is known that for the material in question permeability varies directly with vapor pressure difference, tests may be carried out at normal temperature and humidity and calculated with fair accuracy to appreciably higher temperatures and humidities. Such a procedure, because of the slow rate of penetration, lengthens the test but facilitates the control and generally simplifies the testing problem. Conversely, unless the material is known to have permeability characteristics which result in a direct relationship between permeability and vapor pressure difference, permeability at higher vapor pressures cannot be satisfactorily calculated from test data obtained at low vapor pressure differences, and caution must be used in adopting test conditions which depart essentially from those under which the wrapper is to be employed.

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S. D. Gehman of the Goodyear Tire and Rubber Company for valuable suggestions relating to the effect of barometric pressure on the test.

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In addition to the published papers listed above, the writers have had the privilege of examining a number of comparable procedures described in private communications which have not yet appeared in the literature.

New Handbook of Chemistry

A new manual is now available for chemists—The Handbook of Chemistry, compiled and edited by N. A. Lange, Professor of Organic Chemistry at Case School of Applied Science. Its 1,500 pages of excellent printing makes it the largest book of its type devoted principally to the interest of the industrial chemist.

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Copies may be obtained from the Book Department of the Technical Association of the Pulp and Paper Industry, 122 E. 42nd street, New York, N. Y., at $6 per copy.

NRA Paper Study Progresses

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C. October 2, 1935—E. C. Popp, who is in charge of the paper study for the NRA reports that satisfactory progress is being made.

Field work has not yet been begun but it probably will be about the middle of this month. At the moment, some 30 persons who are working on the study under Mr. Popp, are going through the NRA files for the code experience during the existence of NRA. Mr. Popp has been officially designated by NRA as contact man with the paper industry for the NRA Board of Review so that all communications on the subject of the study will clear through him and there will not be requests for information coming from various NRA officials.

Pulp and Paper Industry Literature Review

Abstracts of Articles and Patents Compiled by the Abstracts and Bibliography Committee of the Technical Association of the Pulp and Paper Industry, A. Papineau-Couture, John F. Ohlson, C. E. Peterson and Clarence J. West, Chairman

Copies of United States Patents can be obtained from the United States Patent Office, Washington, D. C., for 10 cents each. Send currency, not stamps.

Raw Materials

Studies of Alder as Cellulose Raw Material. O Routala and Heikki Sihtola. Acta Chem. Fennica 7A:113-119 (1934); C. A. 29:2351.—The rapid growth, hardiness and soil-enriching character of the alder due to its capacity for nitrogen fixation make it desirable as a possible future source of cellulose. Its undesirable characteristics are (1) its tendency to rot after 45 years' growth, (2) its high tannin content, which gives a dark brown color to sulphate pulp and (3) its weak structure due to the rapid growth and short fibers. Analysis of alder gave pentosan 22, lignin 25 and cellulose 47.93 per cent. With the right cooking conditions, temperature, pressure and acid concentration with 1.6 per cent lime a sulphite cellulose with a breaking length of 8400 meters was produced from alder after cooking 11 hours. In a mixed cooking of 1:1 pine and alder the strength was increased (10,200 meters at 50° Schopper-Riegler in 55 minutes). Alder sulphite and sulphate cellulose can be bleached with a chlorine-calcium hypochlorite bleach to a white pulp in which the strength is even increased.—C.J.W.

Southern Pine for Rayon. C. H. Herty and R. H. Rasch. Rayon and Melliand Textile Monthly 16, No. 2:107-109 (Feb., 1935).—Southern pine pulps were prepared on a small scale. The data on the semi-commercial pulps compared favorably with the data of commercial rayon pulps except for the high ash content. A rayon manufacturer successfully processed the pulp.—C.J.W.

Rice Straw and Its Utilization on the Paper Industry. L. Stangalini. Ind. carta 1, No. 11:503-510 (Nov., 1934).—Rice straw, in general, is not considered a very suitable raw material for paper manufacture, chiefly on account of its high silica content. The present article describes the physical and chemical characteristics of this fiber and modifications of the calcium bisulphite and monosulphite cooking process adapted to this type of material, according to which good pulps suitable for paper manufacture can be obtained.—C.J.W.

Composition of Philippine Woods. VII. F. M. Yenko, Luz Baens, Augustus West and H. M. Curran. PHILIPPINE J. SCI. 55:1-9 (1934).—Results are reported and discussed of the analysis of 24 species of wood which were carried out by the methods of U. S. Forest Products Laboratory.—A.P.-C.

Paper Making Trials with Coniferous Woods from Southern Rhodesia. Bull. Imp. Inst. 32; 343-348 (1934).—*Pinus insignis, Pinus ratula* and *Cupressus lusitanica* were cooked with 20 parts of caustic soda (calculated on the weight of the wood) at a concentration of 4 per cent for 6 hrs. at a temperature of 160° C. and yielded, respectively, 59.3, 54.0 and 44.9 per cent of unbleached pulp and 52.9, 48.3 and 40.3 per cent of bleached pulp. The unbleached pulps were strong and long-fibered. *P. insignis* and *P. patula* would be suitable for the manufacture of groundwood; on account of many resinous knots and its rather dark color, *Cypressus lusitanica* would be less suitable. All three could be used for the production of kraft wrapping papers.—A.P.-C.

Preparation of Wet-Spinning Waste for Manufacture of Paper. W. W. Triggs assignee of Papierfabrik Spechthausen A. G. Brit. pat. 419,874 (June 23, 1934).—Wet-spinning waste from flax or hemp is freed from shives by beating, tearing, and treatment in a willow, with, in each case, simultaneous application of suction.—A.P.-C.

Process of Recovering Fiber from Waste Paper. Francis H. Snyder, assignor to Snyder Maclaren Process, Inc. U. S. pat. 1,988,363 (Jan. 15, 1935).—A dilute aqueous suspension of pulped waste paper is treated with a fatty alcohol having more than eight carbon atoms, or certain derivatives of such alcohols, preferably in conjunction with a mild alkali or a mild alkali and soap. The fibers are then separated from the de-inking solution and washed.—A.P.-C.

Method of Disintegrating Fibrous Materials. Thomas Robinson, assignor to Lancaster Processes, Inc. U. S. pat. 1,977,807 (Oct. 23, 1934).—Waste paper is reduced to small pieces (*e.g.*, in a hammer mill), stirred in a warm (about 160° to 170° F.) dilute (about 2 per cent to 3 per cent on the weight of the paper) solution of a mild detergent such as soap, and passed through a pipe in a thin annular stream into which project the ends of rapidly rotating (about 3600 r.p.m.) blades. The material is discharged into a tank from which the sufficiently reduced material is withdrawn and the remainder is passed back into the apparatus.—A.P.-C.

Method of Removing Ink from and Bleaching Printed Paper. Walter S. Crisp, assignor to William J. Weir. U. S. pat. 1,993,362 (March 5, 1935).—The invention provides a continuous process of de-inking and bleaching waste paper which consists in subjecting a suspension of the stock in a breaker or beater to the simultaneous action of an alkali (preferably soda ash or caustic soda), a solvent for the ink and ink vehicle and a flotation oil, and then adding a chlorine bleaching agent while continuing the beating, and subsequently washing to remove the dyes, oils and refuse matter.—A.P.-C.

Reclaiming Pulp from Waste Paper. Francis H. Snyder, assignor to Snyder Maclaren Processes, Inc., U. S. pat. 1,991,823 (Feb. 19, 1935).—The paper is treated, *e.g.*, in the beater, with a solution of a soap-forming fatty acid and an alkali metal sulphite, or of alkali metal salt of a soap-forming fatty acid and an available sulphurous acid radical, *e.g.*, oleic acid and sodium sulphite, or sodium oleate and sodium bisulphite or sulphur dioxide.—A.P.-C.

Process of De-inking Paper. Henry B. Haas, assignor to Purdue Research Foundation. U. S. pat. 1,990,376 (Feb. 5, 1935).—Waste printed paper is beaten at high temperature (110° to 180° F.) in presence of a solution containing a modified soap which consists of ordinary soap mixed with chlorinated hydrocarbons that are liquid under the conditions of use, and also (if desired) with one or more liquid hydrocarbons.—A.P.-C.

Method of Removing Bleachable Pigments from Paper Containing Lignocellulosic Constituents. Sidney D. Wells, assignor to Lewis L. Alsted. U. S. pat. 1,922,977

(March 5, 1935).—Waste papers that have been printed with a bleachable ink are treated with an alkaline calcium hypochlorite solution, and caustic soda is added from time to time during the treatment so as to maintain the alkalinity substantially at or above pH 8, thereby precluding chlorination of the lignin and confining the reaction to oxidation of the ink pigment.—A.P.-C.

Process for the Manufacture of Pulp from Peat. Erhard Bergmann, Pelkowitz, Czch. Ger. pat. 577,011 (July 11, 1931).—The peat is first cleaned and then through grinding, rubbing, cutting and impact the peat is broken up while it is in a frozen condition. The peat is then cooked with water under pressure and then given a light bleaching after which it is obtained in a condition free from lignin, coloring matter and other impurities. —J.F.O.

Cellulose and Lignin

Chemistry of Cellulose. H. Staudinger. Naturwissenschaften 22:797-803 (1934); C. A. 29:1979.—A review of recent work on the constitution of cellulose, its preparation and the comparison of synthetic polymers with cellulose. From the evidence discussed and the chemical reactions of cellulose it is concluded to have a macromolecular structure.—C.J.W.

Concerning the Behavior of Cell and Fiberous Matter in Salt Solutions. Max Ludtke, Agronomy University Bonn Poppelsdorf. Papier-Fabr. 32, No. 49; 509-12; No. 51/52; 528-34 (Dec. 9, 30, 1934).—A method is described which determines the acid groups consisting mainly of COOH, in cell and fiberous matter. The acid quantity contained in 1 gram of dried substances is represented as the number of ccm N/100 solution and is called the "acid number." With the aid of this method, the absorption of cations from calcium acetate and other salt solutions under various conditions was studied, that is the testing of the pre-treatment, quantity and concentration of salt solution, time, hydrogen ion concentration, and the quantity of pulp. The double decomposition forms an equilibrium reaction which is dependent on the pH of the salt solution. The salt of the "fiber acid" is split off hydrolytically. In order to determine the absolute acid number, experiments were conducted in an alcoholic potassium acetate solution whose results were somewhat higher than in an aqueous calcium acetate solution. The acid numbers of various pulps and fiberous materials according to both methods and a previous discussed iodine method were tabulated and discussed. A cation absorption does not take place in an acid or neutral surrounding but it does in a basic one.—J.F.O.

Swelling and the Mechanics of Natural and Artificial Cellulose Fibers. W. Weltzien. Papier-Fabr. 32, No. 42; 433-37 (Oct. 21, 1934).—Numerous theoretical facts concerning the mechanics of the natural and artificial cellulose fibers which are of great value in the processing of these materials.—J.F.O.

The Swelling of Cellulose in Alkali. IV. Swelling of Cross Sections of Cotton and Pulp Fiber in Alkali. Gi-ichi Saito. J. Soc. Chem. Ind. Japan 37B: 576-579 (Oct., 1934).—Three differently treated batches of upland cotton and a batch of DKS extra pulp (Waldhof) were tested and results at 25° and 14° C. are reported for caustic soda concentrations varying from 0 to 507 g. per 1. Cross-sectional area, swelling ratio, of long to short cross-section diameter and roundness are given, each value representing the mean of 200 fibers. When cotton extracted with 1:1 alcohol-benzene mixture is treated at 25° C., the maximum swelling point lies between 200 and 250 g. per 1. of caustic soda, the corresponding values for purified cotton at 25° and at 14° C. and wood pulp fiber at 25° C. are: 150-170, 120-150, 130-150 g. per 1. of caustic soda. When the treating temperature decreases, the cross section of the fiber swells more and the maximum swelling point shifts to lower alkali concentrations in natural fiber, but not in regenerated-cellulose fiber.—A.P.-C.

Swelling of Cellulose in Alkali. V. Influence of Purification and Mercerization of the Swelling Degree of Ramie Fiber. Gi-ichi Saito. J. Soc. Chem. Ind. Japan 37B: 579-582 (Oct., 1934).—The raw material was a technically bleached Chinese ramie which was purified (1) by boiling 4 times with 2 per cent caustic soda for 4 hours in a current of hydrogen, and (2) by bleaching 4 times with sodium hypochlorite solution (containing 0.05 per cent available chlorine) for 3 hours, then treated 4 times with a 0.25 per cent chlorine dioxide solution for 24 hours and boiled with 2 per cent sodium sulphite solution for 2 hours. The data for cross-sectional swelling in caustic soda solutions are presented. The raw material was mercerized, free and under tension, and values for cross section of all five samples upon immersion in water are reported. The thickness and lumen of ramie fiber become very small when boiled with dilute caustic soda solution and mercerization under tension gives the same effect, while the thickness remains almost unchanged in the case of free mercerization. The swelling in alkalies decreases as purification increases.—A.P.-C.

Swelling of Cellulose in Alkali. VI. Influence of Alcohol and Salt Upon the Swelling. Gi-ichi Saito. J. Soc. Chem. Ind. Japan 37B: 582-583 (Oct., 1934).—The swelling of ramie and cuprammonium rayon with alcohol and sodium chloride additions was observed, but no close relation with caustic soda absorption could be noted. The influence of added substances was greater upon cuprammonium rayon.—A.P.-C.

Swelling of Cellulose in Alkali. VII. Change of Cross Sectional Area of Ramie and Cuprammonium Rayon During Dilution and Concentration of Alkali. Gi-ichi Saito. J. Soc. Chem. Ind. Japan 37B: 639-642 (Nov., 1934).—Dilution and concentration experiments were made with initial concentrations of 300, 180 and 130 g. per 1. of caustic soda, followed by concentration of the dilute solutions. Data for cross-sectional area, swelling ratio, of long to short cross-sectional diameter and roundness are reported at 20° C. for technically bleached Chinese ramie together with concentration experiments with free mercerizd ramie. Similar data are reported for cuprammonium rayon at 25° C. No reversible swelling for either material was observed.—A.P.-C.

Swelling of Cellulose in Alkali. VIII. General Discussion. Gi-ichi Saito. J. Soc. Chem. Ind. Japan 37 B: 642-645 (Nov., 1934).—Caustic soda absorption, swelling and x-ray diagrams are compared and discussed and it is concluded that no intimate relationship exists between the x-ray diagram of alkali cellulose and its swelling. Bibliography of 9 references.—A.P.-C.

Action of Alkaline Copper Solution on Cellulose. Yujiro Takamatsu. Cellulose Ind. (Tokyo) 10: 221-230 (1934).—Chemical reactions in the system cellulose-copper-alkali (1) are compared with those of the system cellulose-copper-ammonia-alkali (2). In (1) the combining ratio of alkali to cellulose is increased with an increase in concentration of caustic alkali (6 to 40 per cent), but the copper:cellulose ratio (3) is kept almost invariable, showing the definite combining ratio C_6:Cu:Na = 1:0.65:0.7-0.8. (3) Differs distinctly according to the amount of cellulose. On repetition of the treatment with alkaline copper solution, the compound of the lower combining ratio is transformed into that of the higher ratio,

whereas the latter remains almost constant. Thus the mutual reaction in (1) gives, regardless of the presence of amine, a compound of definite composition, similar to, or almost the same as, the compound found in (2) by Hess (*Physik. Chem.* 145, 401-450 (1929).) The x-ray diagrams show also the similarity of the compounds in the two systems. This indicates that the presence of ammonia is not necessary for the preparation of the cellulose-copper-alkali compound. If ammonia is added to (1), (3) is never increased, whereas the combining rate of copper to cellulose, expressed by Sakurada's kinetic equation (*Ber.* 63B, 2043-2044 (1930)) increases with an increasing amount of ammonia. Therefore the addition of ammonia does not accelerate the chemical reaction between cellulose and copper-alkali.—A.P.-C.

Determination of Viscosity for the Characterization of Cellulosic Substances. Ichiro Sakurada. CELLULOSE IND. (TOYKO) 10: 197-203 (1934).—For the determination of the viscosity of cellulosic substances it is most convenient to calculate the value of f, the specific volume of the colloidal particle, which is a constant independent of concentration, instead of determining the relative viscosity at any given concentration. The value of f can most conveniently be calculated by determination of the viscosity of a solution of relative viscosity not much greater than 3. At such a concentration, one viscometer is sufficient for the determination, the viscosity values obtained are less affected by the shearing stress, and the f value for the substance bears comparatively simple statistical relationships with its chemical characteristics, *i. e.*, the tensile strength is expressed by $A-(B/f)$ and the copper number by c/f, in which A, B and C are constants. —A.P.-C.

The Methylene Blue Number of Cellulose. M. Brissaud. MEM. POUDRES 26, No. 1; 93-100 (1934-35); TIBA 12; 913-917 (Dec., 1934).—Cellulose was immersed in a buffered solution of N/250 methylene blue and the excess titrated with Naphthol Yellow S. It was found that the methylene blue number bears no relation to the copper or iodine numbers; it is affected by the pH of the solution. An energetic purification treatment which increases the iodine and copper numbers decreases the methylene blue number. It is a measure of the non-cellulosic impurities and is most satisfactory for use with wood pulp and straw. —A.P.-C.

Photochemical Reaction of Cellulose. II. Action of Light and the Copper Number of Some Cellulose Samples. Sutezo Oguri. J. Soc. CHEM. IND. JAPAN 37 B; 620-621 (Oct., 1934).—Experimental data for copper numbers on exposure to ultra-violet light are presented for tissue paper, dry and moistened with water and caustic soda solutions, viscose and filter paper. The curve for exposure time versus copper number is a straight line for tissue paper, but not for viscose and filter paper. One of the filter paper experiments was made in a quartz apparatus to exclude the effect of any possible ozone, which might be formed by the mercury vapor lamp used in the other experiments, and the absence of ozone resulted in an appreciable decrease in the copper number.—A.P.-C.

Adsorption of Organic Liquids by Cellulose Products. J. Wiertelak and I. Garbaczowna. IND. ENG. CHEM. ANAL. ED. 7: 110-111 (March 15, 1935).—Various cellulose preparations adsorb alcohols, pyridine and especially benzene-alcohol mixtures. The adsorbed liquid is not removed from the fibers even by prolonged heating at 105°C., but may be removed by washing with ether or water. Ether, benzene and gasoline are not adsorbed. The adsorption causes a marked lowering of the value for the extractive content of sawdust, if that value is determined by weighing the sawdust.—A. P.-C.

Hydration of the Fiber. IV. Fluctuation of Fiber Length Through Change of Atmospheric Humidity. Hiroshi Sobue. J. Soc. EHCM. IND. JAPAN 37 B: 777-780 (Dec., 1934).—In the swelling of fiber both the intermicellar and intramicellar imbibition occur generally, but the intramicellar swelling is very small in a natural cellulose fiber and relatively large in a regenerated cellulose fiber and an animal fiber treated with alkali. The time lag of fluctuation is small in rayon, especially in viscose rayon, and therefore it is usable in a hair hygrometer.—A.P.-C.

Lignin Determination at Low Temperatures and the Complete Hydrolysis of Straw. R. S. Hilpert and E. Littman. Ber. 68 B: 16-18 (1935); C. A. 29: 2352.—The amount of precipitate formed by the reaction of sugars with 72 per cent sulphuric acid under conditions for which lignin is determined by hydrolysis of the plant material decreases rapidly with decrease in temperature until at 6° C. there is practically none. Unbleached soda plup gives no lignin at this temperature. Rye straw, however, after hydrolysis at 6° C. forms, with dilution and boiling, a precipitate (approximately 16 per cent) consisting of a mixture of carbohydrates and "lignin." With hydrolysis at a temperature below —10° C. a very small residue consisting mainly of the ash remains. On dilution a flocculent precipitate, $2C_6H_{10}O_5.H_2O$, separates. In addition to this absence of lignin in the hydrolyzate, there are two facts which indicate that straw consists entirely of carbohydrates: the analogous influence of temperature on "lignin" formation from sugar and straw, and the corresponding composition of straw "lignin" and sugar "lignin."—C. J. W.

Thioglycolic Acid as a Lignin Reagent. Bror Holmberg. Ing. Vetenskaps Akad. Handl. No. 131. 1934. 85 p. C. A. 29: 1136.—A new means of characterizing native lignin, wherever it occurs in the plant kingdom, depends on its condensation with thioglycolic acid in the presence of an acid catalyst (as 2 N hydrochloric acid) to form compounds insoluble in water but readily soluble in sodium hydroxide. It is essential, however, to make ultimate analyses of the condensation products since in some instances compounds unrelated to lignin are also carried down. The technic, previously applied to spruce wood, has now been extended to a large number of plant tissues and Holmberg gives a comprehensive survey of the distribution of lignin.—C. J. W.

The Fine Structure of Wood. I. The swelling in volume of spruce wood and lignin in different media. Kolloid-Beihefte 40, No. 7-12: 413-448 (Dec. 1, 1934).—A discussion is given of the conditions existing during the swelling of wood as shown by botanical, morphological, chemical and x-ray investigations. Swelling decrease on ageing is attributed to reduction of space inside the cell walls by deformation and slippage of micellae. To test these results the dimension changes on gradual drying of spruce were measured after the samples were first soaked in benzene, ether, acetone, pyridine, methanol and water, the swelling behavior of each in steam was then studied and the lignin isolated from the wood was treated likewise. Swelling of wood and lignin occurred in all solvents employed. The amount of swelling of lignin was greatest in acetone, then pyridine and least in water; it increased in the case of wood with the water-like character of the solvent.—C. J. W.

Nodulizing Paper Stock. Sidney D. Wells. U. S. pat. 1,986,907 (Jan. 8, 1935).—Waste paper is beaten in a rod mill with about 500 gal. of water, 1 gal. of kerosene,

20 lbs. of bentonite and 50 lbs. of soda ash per 2,000 lbs. of the waste paper, to obtain a product which may be used for removing sulphur dioxide from smelter gases.—A.P.-C.

Studies on Lignin and Related Compounds. XI. The Nature of Lignite Humic Acid and the So-Called "Humic Acid' from Sucrose. Mark Plunguian and Harold Hibbert. J. Am. Chem. Soc. 57: 528-536 (March, 1935).—Lignite humic acid isolated from Ontario lignite by extraction with alkali and sugar humic acid prepared from sucrose by the action of 72 per cent sulphuric acid were carefully purified, and well-defined derivatives of both types were prepared by methylation, acetylation and alkaline hydrolysis. Lignite humic acid has the empirical formula $C_{77}H_{54}O_{11}(OCH_3)$ $(OH)_8(COOH)_4$; of the hydroxyl groups, two are apparently associated with keto-enol isomerism, while the remaining six are characterized by high acidity. Sugar humic acid has the empirical formula $C_{55}H_{41}O_{11}(OH)_4(COOH)_4$; three of the hydroxyls are aliphatic and the other is of a much more acidic type. The evidence obtained indicates clearly that the two types of humic acid have markedly different structures.—A.P.-C.

Spruce Holocellulose and the Composition of its Easily Hydrolyzable Fraction. E. F. Kurth and George J. Ritter. J. Am. Chem. Soc. 56: 2720-2723 (Dec., 1934).—A modified method is given for the isolation of holocellulose (total carbohydrates material in extractive-free wood) from spruce. This differs from the extractive-free wood mainly in the absence of lignin. After hydrolysis with 1 per cent sulphuric acid the carbohydrate residue is comparable with Cross and Bevan cellulose. The dilute sulphuric acid removes an easily hydrolyzable hemicellulosic fraction similar to a fraction that under the older methods of analysis has always been mixed with other wood constituents. It is composed of constituents that contain methoxy, carboxyl, acetyl and formyl groups and that may be hydrolyzed to mannose, glucose, galactose, arabinose and xylose; as anhydride the percentage yields of hydrolyzed material were 17.7, 8, 7.8, 12.5 and 20.9; uronic acid anhydride, 14.6 per cent; volatile acids 8 per cent.—A.P.-C.

Studies on Bagasse. V. General Properties of Bagasse. Yoshikazu Hachihama and Hachiro Saegusa. J. Soc. Chem. Ind. Japan 37 B: 771-772 (Dec., 1934).—Lignin was extracted from bagasse by digesting at 180°C. for 2 hrs. with a 25 molecular per cent solution of ethyl alcohol made alkaline (pH 13) with caustic soda. Three lignin fractions were separated, giving about 94 per cent of crude product, which yielded 75 per cent upon purification (melting 130° to 140°C.). No distinct differences existed between the fractions. The absence of pentosan and ethoxyl groups was established. Lignin extracted by dioxane digestion (in presence of a small amount of hydrochloric acid) at 80° to 90°C. for 5 hours had a lighter color and melted at about 130°C. It contained about 10 per cent of combined pentosan and 15.2 per cent methoxy or 16.9 per cent methoxy on a pentosan-free basis, in agreement with the values for alcohol extraction. It is concluded that lignin extracted by aqueous solutions of ethyl alcohol did not suffer any intense change at the high temperature.—A.P.-C.

Studies on Bagasse. IV. Isolation of Lignin by the Action of Alcohol. Yoshikazu Hachihama and Koichiro Shinra. J. Soc. Chem. Ind. Japan 37 B: 584-585 (Oct., 1934).—The most favorable conditions for extracting lignin from bagasse without affecting other constituents are: 20 cc. of aqueous alcohols (25 mols per cent of alcohol), made slightly alkaline (pH of 13.0) with caustic soda, for 1 g. of bagasse, the digestion mixture to be kept at 180°C. for 2 hours. About 95 per cent lignin and 10 per cent hemicellulose are dissolved. When the method was applied to wood sawdust (Todomatsu) only one-third of the lignin and pentosan of the wood was dissolved.—A.P.-C.

Mechanical Process

The Blueing of Groundwood Pulp. E Melin and J. A. Nannfeldt. Pappers-Travarutid Finland 17, No. 1: 27-28, 30-32 (Jan. 15, 1935); Svensk Pappers-tidn. 38, No. 2: 59 (Jan. 31, 1935).—The blueing of wood and groundwood pulp is caused by certain fungi with dark colored hyphae which occur in many groundwood mills. They form round, oval or irregular spots in the finished sheets, 1-3 cm. in diameter, one sheet being capable of infecting a number of sheets. Samples from 17 Swedish groundwood mills were studied. The main sources of infection were found to be the pulpwood, the fresh water and especially the factory air. Grinding at high temperature kills the fungi (70-80° C.). The spore content in fresh water is considerably lower than in the back water, but in spite of all spores being killed during the hot grinding process, infection from the stored pulpwood spreads continuously to the air and from there is passed on to the white water and pulp, whether the hot or cold grinding process has been employed. Borax, sodium fluoride, sodium dichromate and other chemicals can be added to the water or pulp for combating the fungi. They are also killed by chlorine, but much larger quantities are required than for bacteria, so that the process is no longer economical. Treatment with sulphur dioxide has successfully reduced the trouble. A biological method is also recommended.—C.J.W.

Closed Back Water System for Newsprint Machines. B. M. Hrabie. Pappers Travarutid, Finland 16, No. 22: 930-932, 934 (Nov. 30, 1934).—The system being developed at the Kyröfors mill effects a separation of the richer back waters from those low in fiber content. The former may be used at the grinders while the latter are treated to be made available as shower waters. Apparatus and flows used in the system in its present development are described briefly.—C.J.W.

The Influence of the Height of the Stock in the Grinder Pit in the Ground Wood Process. W. Brecht and K. Hertzberg. Wochbl. Papier. fabr. 65, Special Number: 13-25 (1934).—Experiments were conducted with a Norton stone in a Voith continuous pulp grinder to determine the effect of the height of the stock in the grinder pit. In order to prevent the stock from filling up the pores in the stone, the more dilute the stock is in the grinder pit the less the stone should be submerged in the stock. Keeping within the above limit, an increase in the amount the stone is submerged means a decrease in the production but also an increase in the quality. All details in the calculations and experiments are given.—J.F.O.

Experiments on the Steaming of Wood. M. Robinow and W. Kondratjew. Zellstoff U. Papier, 15, No. 1: 10-11 (Jan., 1935).—Experiments were conducted on a laboratory scale with an autoclave and then on a commercial scale. The spruce wood was steamed at pressures of 4, 5 and 6 atmospheres and for varying lengths of time from 5 to 15 hours, and then ground wood was made therefrom. The results of the chemical and physical tests are given.—J.F.O.

Pulp Wood Grinder with Several Individual Presses. Moritz Wolf, Vienna. Ger. pat. 602, 614 (Nov. 19, 1932); addition to Ger. pat. 569,388.—The patent pertains to a system for regulating the pressures of the individual presses.—J. F. O.

Method of Purifying Groundwood Pulp. Horace

Freeman and John W. Hunter, assignors to Consolidated Paper Corp., Ltd. U. S. pat. 1,988,416 (Jan. 15, 1935).—Groundwood is purified by passing numerous fine streams of air upwardly through the pulp, before washing and screening, and removing the foam that forms at the surface of the liquid.—A.P.-C.

Defiberizer. Ernest C. Shaw and William G. Hagmaier, assignors to Allis-Chalmers Manufacturing Co. U. S. pat. 1,987,946 (Jan. 15, 1935).—A series of wood-containing hoppers are mounted to travel over a circular table. In the latter are a series of openings beneath each of which is a rotating drum, the surface of which is provided with points or needles that project upwardly through the openings in the table to defiberize the wood. Means are provided for automatically feeding logs to the hoppers as required.—A.P.-C.

Alkaline Processes

Economic Possibilities of Pulping Timber Growth of the Costal Plain. E. E. Randolph and W. L. Belvin. J. Elisha Mitchell Sci. Soc. 50:47-48 (1934); C. A. 29:1628.—Chemical analysis and small scale pulping tests by the soda process were made on 9 species of hardwoods. Black gum may be used as a pulp wood where great strength and permanence are not required. Red gum, sycamore and beech are satisfactory as filler for newsprint and *Alianthus* as a filler for high-grade paper or as a base for absorbent paper. Fiber is too short in red maple and black willow and bleaching and pulping are too difficult with sassafras and sourwood for commercial exploitation.—C.J.-W.

Use of Jute Rags in the Composition of Copying Papers. S. S. Kharaz and S. E. Gornostaipol'skii. Bumazhnaya Prom. 13, No. 8:47-50 (1934); C. A. 29:1244.—Stock containing up to 5 per cent lignin was obtained by pulping jute waste with 5 per cent sodium hydroxide and 10 per cent lime at 3.5-4 atmospheres pressure for 10 hours and subsequent two-stage bleaching with 3 and 2 per cent active chlorine with an intermediate washing for 1-1.5 hours. Paper containing 35 per cent of the pulp gave satisfactory, pale-cream copying sheets. —C.J.W.

Refined Sulphate Black Liquor Talloel and Process of Making the Same. Torsten Hasselstrom. U. S. pat. 1,986,815 (Jan. 18, 1935).—Crude talloel is refined by allowing to stand for about 2 to 10 days, removing the separated detrimental solid constituents (including ligneous matters and higher saturated fatty acids), and maintaining the product at a temperature of from −10° to +25° C. to effect further separation of detrimental solid constituents.—A.P.-C.

Cyclic Process of Pulping Raw Cellulosic Material. George A. Richter, assignor to Brown Co. U. S. pat. 1,987,214 (Jan. 8, 1935).—In pulping wood by the kraft process practically all of the black liquor is re-used, fortifying it with solid caustic soda or with a 50 per cent solution, until the total solids content has been raised to about 50 per cent. From this point a small portion of the black liquor is sent directly to the incinerator for recovery, and the remainder is brought up to the requisite strength in caustic soda and to the required volume and re-used for cooking.—A.P.-C.

Black Soap from Sulphate Black Liquor. An Important New Raw Material for the Soap Industry. Ewalt Pyhala. Mat. Grasses 26; 10290-10292, 10317-10319 (Oct., Nov., 1934).—A review of the development of the production of talloel and of black soap therefrom, showing the reasons which have hitherto militated against commercial adoption of this soap, together with a description of the author's process for the purification and bleaching of the soap and an outline of the merits of the product obtained. The process (U. S. pat. 1,887,246, Nov. 8, 1932) consists essentially in treating the raw soap while hot with a dilute peroxide solution, salting out the soap, tapping off the underlying water, washing with a small quantity of water, salting and tapping the wash water from the refined and decolorized soap.—A.P.-C.

Method of Making Straw Paper. Pierre Drewsen, assignor to Hinde and Dauch Paper Co. U. S. pat. 1,991,499 (Feb. 19, 1935).—Straw is defibered mechanically in the presence of a relatively small quantity of alkali solution at a high concentration, and the residual alkali is neutralized while the material is still being subjected to the mechanical treatment. Suitable proportions are: 100 lb. straw, 300 lb. water, 6 to 10 lb. caustic soda or 5 to 8 lb. of quicklime or the equivalent of other alkali.—A.P.-C.

Production of Cellulose. César Bouvier. Fr. pat. 770,703 (Sept. 20, 1934).—Vegetable materials are submitted, before the cooking proper, to a preliminary treatment with a very weak alkaline liquor, *e.g.*, 1 per cent caustic soda, and at a low temperature, but under high mechanical pressure to dissolve the incrustants and lignin contained in the materials to be treated. An apparatus is described.—A.P.-C.

Smelting Ovens. W. Schmid. Papier-Fabr. 32, No. 48:485-88 (Dec. 2, 1934).—The author reviews the technical progress made in the construction of the smelt oven and the rotating ovens. Various makes of smelt ovens and systems are described in detail, as well as methods for cooling the air inlets.—J.F.O.

Wall for Smelting Oven or Similar Installation, or Lining for a Soda Oven in the Manufacture of Sulphate Pulp. S. G. Soderholm and E. Nystrom, Helsingfors. Finn. pat. 15,831 (Oct. 14, 1932).—The wall or lining is provided with water cooled pipes.—J.F.-O.

Device for Rotating Soda Ovens. A. Bol. Svenska Maskinverken, Soderhamn. Swed. pat. 81,086 (May 26, 1930).—A device for cooling that part of the gas inlet which extends into the oven.—J.F.O.

Process for the Distillation of "Floating Rosin" Precipitated as a By-Product in the Manufacture of Sulphate Pulp. E. Oeman, Stocksund. Finn. pat. 15, 731 (Feb. 27, 1931).—The distillation takes place by means of gases or vapors in a liquid immiscible with the rosin for the purpose of separating the fatty and resinic acids. —J.F.O.

Process for the Recovery of Phytosterin, Fatty and Resinic Acids Obtained from the Raw Sulphate Soap as By-Product in the Manufacture of Sulphate Pulp. H. Sandquist and T. O. H. Lindstrom, Stockholm. Swed. pat. 80,941 (March 22, 1928).—The dried or highly concentrated soap is extracted with a suitable solvent in which phytosterin and the unsaponifiable material are soluble. The impurities are removed with sodium hydroxide, the solvent distilled off and the residue recrystallized with alcohol for the purpose of obtaining pure phytosterin.—J.F.O.

Condor V-Belt Construction

The Manhattan Rubber Manufacturing Division, Passaic, N. J., has just issued a new bulletin No. 6840 describing and explaining the details of the construction of Condor V-Belts. Numerous diagrams illustrate the valuable technical data which is of interest to all users of V-Belts and makes clear the reasons for the long service life and high operating efficiency of this Manhattan product.

IMPORTS OF PAPER AND PAPER STOCK

NEW YORK, BOSTON, PHILADELPHIA AND OTHER PORTS

NEW YORK IMPORTS

WEEK ENDING SEPTEMBER 30, 1935

CIGARETTE PAPER

Champagne Paper Corp., Normandie, Havre, 290 cs.

NEWS PRINT

Walker Goulard Plehn Co., Inc., Deutschland, Hamburg, 48 bls.; Perkins Goodwin & Co., Deutschland, Hamburg, 89 rolls; N. Y. Post, Eir Port Alfred, Que., 1,311 rolls; Gilman Paper Co., Eir Port Alfred, Que., 691 rolls; Parsons & Whittemore, Inc., Stavangerfjord, Oslo, 36 rolls; ———, Stavangerfjord, Oslo, 615 rolls; H. Reeve Angel & Co., Inc., Scanmail, Kotka, 275 rolls; Jay Madden Corp., Scanmail, Kotka, 342 rolls; Perkins Goodwin & Co., Hamburg, Hamburg, 93 rolls.

PRINTING PAPER

J. H. & G. B. Siebold, Inc., Deutschland, Hamburg, 30 cs.; Walker Goulard Plehn Co., Inc., Hamburg, Hamburg, 87 bls.

WRAPPING PAPER

F. C. Strype, J. Jadot, Antwerp, 4 cs.; ———, Statendam, Rotterdam, 86 bls.; ———, Black Eagle, Rotterdam, 28 bls.

FILTER PAPER

C. Schleicher & Schull Co., Inc., Deutschland, Hamburg, 14 cs.; C. Schleicher & Schull Co., Inc., Hamburg, Hamburg, 9 cs.; H. Reeve Angel & Co., Inc., American Farmer, London, 13 cs.

GUMMED PAPER

Meadows Wye & Co., American Farmer, London, 5 cs.

METAL PAPER

K. Pauli Co., Deutschland, Hamburg, 53 cs.

BASIC PAPER

Corn Exchange Bank Trust Co., Black, Eagle, Antwerp, 7 cs.

BARYTA COATED PAPER

Globe Shipping Co., Europa, Bremen, 35 crates.

SURFACE COATED PAPER

Gevaert Co. of America, Westernland, Antwerp, 63 cs.; Metropolitan Importing & Manfg. Co., Hamburg, Hamburg, 12 cs.; Phoenix Shipping Co., Hamburg, Hamburg, 2 cs.

DECALCOMANIAS

Sellers Transportation Co., Deutschland, Hamburg, 8 cs.; Sellers Transportation Co., Europa, Bremen, 21 cs.; ———, Hamburg, Hamburg, 2 cs.

DECALCOMANIA PAPER

B. F. Drakenfeld & Co., American Importer, Liverpool, 4 cs. (duplex); B. F. Drakenfeld & Co., American Importer, Liverpool, 6 cs. (simplex).

TRANSFER PAPER

D. C. Andrews & Co., Deutschland, Hamburg, 5 cs.

TISSUE PAPER

Van Ippen & Co., Pr. Adams, Genoa, 5 cs.; A. B. Dick & Co., American Farmer, London, 1 cs.

STENCIL PAPER

International F'd'g' Co., Black Eagle, Antwerp, 6 cs.

COLORED PAPER

———, Black Eagle, Antwerp, 4 cs.; International F'd'g' Co., Hamburg, Hamburg, 8 cs.; ———, Westernland, Antwerp, 2 cs.

WOOD PULP PASTE BOARD

———, Hamburg, Hamburg, 110 bls.

CARD BOARD

American Express Co., Deutschland, Hamburg, 70 cs.

PAPER TUBES

———, Deutschland, Hamburg, 41 cs.

PASTE BOARD

———, Glasgow Maru, Hamburg, 16 cs.

MISCELLANEOUS PAPER

Haas Bros., Statendam, Rotterdam, 4 rolls; Keller Dorian Paper Co., Pr. Adams, Marseilles, 2 cs.; Japan Paper Co., American Farmer, London, 1 cs.; Jay Madden Corp., City of Fairbury, Helsingfors, 63 bbls.; R. Wilson Paper Corp., Caledonia, Glasgow, 11 rolls.

RAGS, BAGGINGS, ETC.

Atlas Waste Manfg. Co., Deutschland, Hamburg, 10 bls. rags.; Banco Coml. Italiane Trust Co., Cristobal Colon, Santander, 112 bls. rags; M. Snedeker Corp., American Importer, Belfast, 304 bls. paper stock; E. J. Keller Co., Inc., Black Eagle, ———, 30 bls. bagging; N. Schwab & Son, Black Eagle, Antwerp, 60 bls. cotton waste; Darmstadt Scott & Courtney, Black Eagle, Antwerp, 265 bls. jute waste; Royal Manfg. Co., Black Eagle, Antwerp, 181 bls. cotton waste; Amtorg Trading Corp., Max Hoelz, Leningrad, 671 bls. flax waste; Amtorg Trading Corp., Max Hoelz, Leningrad, 2,764 bls. rags; ———, American Farmer, London, 38 bls. rags; Guaranty Trust Co., J. Jadot, Antwerp, 60 bls. bagging; Royal Manfg. Co., J. Jadot, Antwerp, 96 bls. cotton waste; ———, Hamburg, Hamburg, 200 bls. cotton waste; New England Waste Co., Belfast Maru, Kobe, 250 bls. cotton waste; ———, Caledonia, Glasgow, 44 bls. paper stock; Castle & Over-

ton, Inc., Paraguayo, Buenos Ayres, 43 bls. dark cottons; Castle & Overton, Inc., Paraguayo, Buenos Ayres, 91 bls. rags.

HIDE CUTTINGS

Great Eastern Packing & Paperstock Corp., Scythia, Liverpool, 15 bags; American Express Co., Scythia, Liverpool, 464 bags.

BONE GLUE

———, Hamburg, Hamburg, 210 bags.

OLD ROPE

Banck Coml. Italiane Trust Co., Cristobal Colon, Pasages, 133 coils; Banck Coml. Italiane Trust Co., Cristobal Colon, Santander, 51 coils. Chase National Bank, American Farmer, London, 42 coils.

CHINA CLAY

Moore & Munger, Baron Saltoun Fowey, 1,532 tons, 13 cwt.; English China Clays Sales Corp., Baron Saltoun, Fowey, 280 bags; J. Dixon Crucible Co., Hamburg, Hamburg, 500 bags, 25,630 kilos.

CASEIN

———, American Legion, Buenos Ayres, 84 bags; ———, Hamburg, Hamburg, 80 bags.

WOOD PULP

E. J. Keller Co., Inc., Deutschland, ———, 335 bls. wood pulp, 50 tons; Bank of N. Y. Trust Co., Deutschland, Hamburg, 120 bls. wood pulp, 24 tons; Castle & Overton, Inc., Deutschland, Hamburg, 520 bls. wood pulp, 104 tons; Bulkley Dunton & Co., Statendam, ———, 206 bls. wood pulp; Bulkley Dunton & Co., Black Eagle, ———, 544 bls. wood pulp, 109 tons; Irving Trust Co., Stavangerfjord, Oslo, 2,500 bls. mechanical pulp; E. M. Sergeant Pulp & Chemical Co., Stavangerfjord, Oslo, 150 bls. chemical pulp; ———, Stavangerfjord, Sarpsborg, 150 bls. sulphite; J. Andersen & Co., Stavangerfjord, Oslo, 1,585 bls. sulphite; Lagerloef Trading Co., Scanmail, Wiborg, 5,988 bls. sulphite, 1,157 tons; Lagerloef Trading Co., Scanmail, Wiborg, 1,270 bls. mechanical, 254 tons; Lagerloef Trading Co., Scanmail, Wiborg, 162 bls. sulphate, 27 tons; Lagerloef Trading Co., Scanmail, Helsingfors, 152 bls. sulphite, 25 tons; Pagel Horton & Co., Inc., Hamburg, Hamburg, 750 bls. sulphate, 152 tons; M. Sone, Cliffwood, Helsingfors, 300 bls. wood pulp; M. Sone, Cliffwood, Gdynia, 260 bls. wood pulp; Bulkley Dunton & Co., Black Hawk, ———, 808 bls. wood pulp.

WOOD PULP BOARDS

Jay Madden Corp., City of Fairbury, Wiborg, 12 bls; Jay Madden Corp., City of Fairbury, Kotka, 13 rolls.

NEWARK IMPORTS

WEEK ENDING SEPTEMBER 30, 1935

H. G. Craig Co., Donpaco, Donnacona, 305 rolls.

ALBANY IMPORTS

WEEK ENDING SEPTEMBER 30, 1935

———, Svanhild, Sweden, 3,000 bls. chemical pulp, 609 tons; Perkins Goodwin & Co., Svanhild, Sweden, 800 bls. sulphite, 162 tons; ———, Svanhild, Sweden, 1,650 bls. sulphite, 279 tons; Price & Pierce, Ltd., Svanhild, Sweden, 1,250 bls. sulphite, 254 tons; Atterbury Bros., Inc., Svanhild, Sweden, 6,075 bls. sulphite, 1,028 tons; Gottesman & Co. Inc., City of Fairbury, Stockholm, 3,600 bls. sulphite, 609 tons; Lagerloef Trading Co., City of Fairbury, Helsingfors, 160 bls. sulphite, 26 tons; Lagerloef Trading Co., City of Fairbury, Wiborg, 170 bls. sulphite, 28 tons; Castle & Overton, Inc., City of Fairbury, Wiborg, 3,051 bls. wood pulp, 611 tons; ———, City of Fairbury, Gdynia, 336 bls. wood pulp, 50 tons; J. Andersen & Co., City of Fairbury, Gdynia, 260 bls. sulphite, 52 tons; Bulkley Dunton & Co., Consul Corfitzen, ———, 2,250 bls. wood pulp.

BOSTON IMPORTS

WEEK ENDING SEPTEMBER 30, 1935

G. F. Malcolm, Inc., Scythia, Liverpool, 32 cs. tissue paper; F. S. Webster, Inc., Scythia, Liverpool, 5 cs. tissue paper; Union Brush Co., Scythia, Liverpool, 556 bags hide cuttings; ———, Scythia, Liverpool, 130 bags hide cuttings; ———, Scythia, Liverpool, 103 bls. cotton waste; ———, Black Eagle, Antwerp, 43 bls. rags; F. J. Fawcett, Black Eagle, Antwerp, 8 bls. flax waste; Royal Manfg. Co., Black Eagle, Antwerp, 178 bls. cotton waste; English China Clays Sales Corp., Baron Saltoun, Fowey, 1,350 bags, 20 casks china clay; English China Clays Sales Corp., Baron Saltoun, Fowey, 2,377 tons, 15 cwt. china clay; M. Sone, Cliffwood, Stocka, 400 bls. wood pulp.

PHILADELPHIA IMPORTS

WEEK ENDING SEPTEMBER 30, 1935

Castle & Overton, Inc., Black Eagle, Antwerp, 163 bls. rags; Philadelphia National Bank, Black Eagle, Antwerp, 287 bls. rags; ———, City of Fairbury, Copenhagen, 250 bls. paper bags; J. W. Hampton, Jr. & Co., Scanmail, Kotka, 202 rolls news print; Lagerloef Trading Co., Scanmail, Wiborg, 1,420 bls. sulphite, 262 tons; E. J. Keller Co., Inc., Boschdyk, ———, 101 bls. paper stock.

BALTIMORE IMPORTS

WEEK ENDING SEPTEMBER 30, 1935

Congoleum Nairn Co., Schodack, Dunkirk, 97 bls. rags; Congoleum Nairn Co., Schodack, Havre, 270 bls. rags; ———, Pr. Adams, Genoa, 28 cs. paper cups; M. Sone, City of Baltimore, Hamburg, 720 bls. wood pulp; M. Sone, Toronto, Oslo, 300 bls. wood pulp.

NORFOLK IMPORTS

WEEK ENDING SEPTEMBER 30, 1935

———, Svanhild, Drammen, 1,500 bls. chemical pulp; ———, Schodack, Havre, 185 bls. bagging.

MONTREAL IMPORTS

WEEK ENDING SEPTEMBER 30, 1935

Gottesman & Co., Inc., Milos, Sweden, 15,000 bls. wood pulp; Gottesman & Co. Inc., Thalatta, Sweden, 10,995 bls. wood pulp; Gottesman & Co. Inc., Braheholm, Sweden, 6,140 bls. wood pulp.

Reports Label Business Active

Charles R. Cosby, secretary of the Label Manufacturers National Association, has returned from a survey of conditions in the West, having called upon the principal label manufacturers of Pittsburgh, Cincinnati, Detroit, Chicago, Milwaukee, Los Angeles and San Francisco. He reports that the label manufacturers in these centers are unusually busy and that prospects for continued activity are excellent.

Proposed New York State TAPPI To Meet

The proposed New York State section of TAPPI will meet at the Syracuse Hotel, Syracuse, N. Y., October 12. John D. Rue will be the principal speaker and his subject will be "Bleaching."

New York Market Review

Office of the PAPER TRADE JOURNAL.
Wednesday, October 2, 1935.

Sentiment in the local paper market is optimistic. Demand for the various standard grades is fairly brisk. Sales forces of the leading paper organizations are conducting a strenuous campaign for orders, with considerable success. Prices are generally holding to formerly quoted levels.

The position of the newsprint paper market is showing signs of improvement, with advertising and circulations running slightly ahead of last year's record. Production in the United States, Canada and Newfoundland is being maintained in sufficient volume to take care of current requirements.

Conditions in the fine paper market are improving. Demand for book, cover, writing and ledger papers is fairly persistent. Prices are steady to firm. Tissues are moving into consumption freely. The coarse paper market is sharing the general improvement. Box board is in better request than of late.

Mechanical Pulp

The ground wood pulp market is steadier. Manufacturing operations in this country and abroad are proceeding in adequate volume and are practically keyed to consumption, with the result that the statistical position of the industry is considered fairly sound. Prices are holding to schedule, in most instances.

Chemical Pulp

Business in the chemical pulp market is holding up well. Kraft pulp continues particularly strong and the recently advanced prices are well maintained. Both domestic and important bleached and unbleached sulphite are steady to firm. From the pulp producers' viewpoint, the outlook is encouraging.

Old Rope and Bagging

Paper mill demand for old rope is slightly better. More interest is being displayed in domestic and foreign old manila rope. Small mixed strings are moderately active. The bagging market is exhibiting a strong undertone. Scrap and gunny bagging are firm, while roofing bagging is in seasonal request.

Rags

The domestic rag market is fairly active. New cotton cuttings are firmer, especially those grades in demand for export account. No. 1 white shirt cuttings, in particular, are holding up exceptionally well. Roofing grades are somewhat quieter, although no radical price changes have been reported. The imported rag market is unchanged.

Waste Paper

Board mill demand for the lower grades of paper stock is less active. Prices are easier, in some instances. Strictly folded news is now quoted at from .35 to .37½ and No. 1 mixed paper at from .27½ to .30. In the higher grades, book stock is firmer. Solid flat book has advanced and is now quoted at from .55 to .60.

Twine

The twine market is gradually becoming livelier and all indications point to a satisfactory volume of orders for the closing months of the year, at least. As usual, the stronger trend of the wrapping paper market is a favorable factor in the situation. Prices are generally holding to schedule.

I. P. & P. Co. Reduces Loss

Archibald R. Graustein, president, in submitting the consolidated statement of profit and loss for the quarter ending June 30, 1935 of the International Paper and Power Company says:

"Submitted herewith is summary of consolidated profit and loss of International Paper and Power Company and subsidiary companies (excluding International Hydro-Electric System and its subsidiaries) for the second quarter and first six months of 1935 together with comparative figures for the corresponding period of 1934. These figures are on the new basis first adopted in the annual report for 1934 and are not comparable with the quarterly statements issued during 1934.

"Consolidated net loss during the second quarter this year was $865,415 as compared with a loss of $936,749 during the second quarter of 1934. Tonnage deliveries of pulp and paper during each month of the second quarter ran consistently ahead of the corresponding month in 1934. For the full second quarter gross sales were $2,158,068 higher in 1935 than in 1934 in spite of lower selling prices for some grades. This improvement was, however, offset in large part by the net increase in expenses and deductions.

Further reductions were made during the quarter in outstanding funded debt of subsidiaries, the consolidated balance sheet at June 30, 1935, showing a net reduction of $1,082,778 in this item as compared to December 31, 1934. This was accomplished without impairment of working capital position."

C. M. Mead Joins S. Austin Bicking Co.

Chas. M. Mead, who for a number of years was connected with the Philadelphia Paper Manufacturing Company, at Manayunk, later the Container Corporation, and more recently secretary and director of the Delaware Paper Mills of Wilmington, Del., has joined the executive staff of the S. Austin Bicking Paper Manufacturing Company, of Downingtown, Pa., as assistant general manager.

Alfred T. Carter Resumes His Position

Alfred T. Carter, New England sales manager of Pejepscot Paper Company, has fully recovered from his recent operation and is back at his office at 161 Devonshire street, Boston, Mass.

Miscellaneous Markets

Office of the PAPER TRADE JOURNAL,
Wednesday, October 2, 1935.

BLANC FIXE.—The position of the blanc fixe market is practically unchanged. Prices are holding to schedule. The pulp is quoted at from $42.50 to $45 per ton, in bulk; while the powder is selling at from 3½ to 3¾ cents per pound, in barrels, at works.

BLEACHING POWDER.—Steadiness prevails in the bleaching powder market. Demand is fairly persistent. The contract movement is well up to average. Prices remain unchanged. Bleaching powder is quoted at from $1.90 to $2.15 per 100 pounds, in drums, at works.

CASEIN.—The casein market is firmer. Domestic standard ground is quoted at 11½ and finely ground at 12; French standard ground at 12¼ and finely ground at 12¾; Argentine standard ground at 12½ and finely ground at 13 cents per pound, all in bags, car lot quantities.

CAUSTIC SODA.—Demand for caustic soda is fairly persistent. Contract shipments are moving in good volume. Solid caustic soda is quoted at from $2.60 to $3.10; while the flake and ground are selling at from $3 to $3.05 per 100 pounds, in drums, at works.

CHINA CLAY.—The china clay market is exhibiting a fairly strong undertone. Prices remain unchanged. Imported china clay is still quoted at from $13.50 to $21 per ton, ship side; while domestic paper making clay is selling at from $6.50 to $12 per ton, at mine.

CHLORINE.—Business in the chlorine market is seasonally active. Shipments against contract are proceeding at a steady pace. Prices are firm. Chlorine is quoted at from $2 to $2.40 per 100 pounds, in tanks, or multi-unit cars, in ton lots, or over, at works.

ROSIN.—The rosin market is stronger. Paper making gum rosin is now quoted at $4.25 and wood rosin at $4.20 per 280 pounds, gross weight, in barrels, at Savannah. Seventy per cent rosin size is selling at $2.52 per 100 pounds, in tank cars, at works.

SALT CAKES.—Paper mill demand for salt cake is brisk. Prices are holding to schedule. Salt cake is quoted at from $12 to $13; and chrome salt cake at from $11 to $12 per ton, at works. Imported salt cake is celling at from $12 to $13 per ton, ship side.

SODA ASH.—The soda ash market is displaying strength. Demand from the paper mills is quite active. Prices are well maintained. Quotations on soda ash, in car lots, at works, per 100 pounds, are as follows: in bulk, $1.05; in bags, $1.20; and in barrels, $1.50.

STARCH.—Conditions in the starch market are fairly satisfactory. The contract movement is normal. Prices remain unchanged. Special paper making starch is quoted at $3.59 per 100 pounds, in bags; and at $3.86 per 100 pounds, in barrels, at works.

SULPHATE OF ALUMINA.—The sulphate of alumina market is steady to firm. Contract shipments are moving freely. Commercial grades are quoted at from $1.35 to $1.50; while iron free is selling at from $1.90 to $2.05 per 100 pounds, in barrels, at works.

SULPHUR.—The sulphur market is marking time. Sulphur is quoted at $18 per long ton on orders of 1,000 tons, or over, on yearly contracts; and at $20 per ton on any smaller quantity over that period. On spot and near by car loads, the quotation is $21 per ton.

TALC.—No radical changes were reported in the talc market. Prices are holding to previously quoted levels. Domestic talc is selling at from $16 to $18 per ton, at eastern mines; while imported talc is selling at from $23 to $30 per ton, on dock.

Market Quotations

Paper

(F. o. b. Mill)

Ledgers	6.50	@	—
Bonds	6.00	@	—
Index	6.00	@	—
Writings—			
Extra Superfine	6.50	@	—
Superfine	6.25	@	—
Tub sized	5.75	@	—
Engine sized	5.50	@	—
Book, Cased—			
S. & S. C.	5.35	@	5.75
S. & S. C. Litho	5.60	@	6.00
M. F.	5.10	@	5.50
Coated and Enamel	5.90	@	6.55
Coated Litho	5.90	@	6.55
Tissues—Per Ream—			
White No. 1	.82½	@	.85
White No. 2	.67½	@	—
Anti-Tarnish M. G. only	1.00	@	—
Colored	.85	@	—
Kraft	.70	@	—
Manila	.67½	@	.70
Manila—			
No. 1 Jute	9.00	@	9.25
No. 2 Jute	7.75	@	8.50
No. 1 Wood	4.00	@	5.25
No. 2 Wood	3.50	@	4.00
Butchers	4.00	@	4.50
Fibre Papers—			
No. 1 Fibre	4.25	@	5.50
No. 2 Fibre	4.00	@	4.75
Common Bogus	1.50	@	3.00
Screenings	2.50	@	3.50
Glassine—			
Bleached	.11	@	—
Unbleached	.09	@	—

(The following Quotations are Delivered New York)

News, per ton—			
Roll, contract	40.00	@	—
Rolls, spot	40.00	@	—
Sheets	45.00	@	—
Kraft—			
No. 1 Northern	4.12½	@	4.75
Standard	4.00	@	—
Southern	3.87½	@	—
Boards—per ton—			
News	32.50	@	35.00
Chip	32.50	@	35.00
Sgl. Mla. Ll. Chip	45.00	@	47.50
Jute Lined Chip	45.00	@	47.50
White Patent Coated	55.00	@	57.50
Binders Boards	67.00	@	75.00

Mechanical Pulp

(On Dock, Atlantic Ports)

No. 1 Imported—			
Moist	21.00	@	22.00
Dry	21.00	@	22.00
(F. o. b. Mill)			
No. 1 Domestic and Canadian	18.00	@	24.00

Chemical Pulp

(On Dock, Atlantic, Gulf and West Coast Ports)

Bleached Sulphite (Domestic and Foreign)—			
Division 1	2.60	@	—*
Division 2	2.55	@	—*
Division 3	2.50	@	—*
Prime Qualities—			
Class 1. All Prime Easy Bleaching	2.05	@	—*
Other Than Easy Bleaching—			
Class 2. Higher than Standard	2.00	@	—*
Class 3, Standard	1.95	@	—*
Class 4, Lower than Standard	1.90	@	—*
(On Dock, Atlantic Ports)			
Kraft No. 1	1.75	@	1.80
Kraft No. 2	1.60	@	1.70
(F. o. b. Pulp Mill)			
Kraft Domestic	1.75	@	1.80
(Delivered)			
Soda Bleached	2.50	@	—

* Add 60 Cents per short ton, dock charges, for Albany; $2.00 for Lake Ports East and $3.00 for Lake Ports West of Mackinac Straits.

Domestic Rags

New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—			
New White, No. 1.	6.00	@	6.25
Silesias No. 1	4.50	@	4.75
New Unbleached	6.75	@	7.00
New Soft Blacks	3.00	@	3.25
Blue Overall	4.25	@	4.50
Fancy	2.50	@	2.75
Washables	1.75	@	2.00
Mixed Khaki Cuttings	3.00	@	3.25
O. D. Khaki Cuttings	3.75	@	4.00
Men's Corduroy	1.50	@	1.75
New Mixed Blacks	2.50	@	2.75

Old Rags

White, No. 1—			
Repacked	3.00	@	3.50
Miscellaneous	2.75	@	3.25
White, No. 2—			
Repacked	1.75	@	2.25
Miscellaneous	1.50	@	1.75
Thirds and Blues—			
Repacked	1.50	@	1.75
Miscellaneous	1.25	@	1.50
Black Stockings	2.50	@	3.00
Roofing Rags—			
No. 1	1.55	@	1.60
No. 2	1.30	@	1.35
No. 3	.95	@	1.00
No. 4	.95	@	1.00
No. 5A	.90	@	1.00

Foreign Rags

New Rags

New Dark Cuttings	1.75	@	1.85
New Mixed Cuttings	1.80	@	1.90
New Light Silesias	3.75	@	4.00
Light Flannelettes	3.75	@	4.00
Unbleached Cuttings	6.50	@	6.75
New White Cuttings	6.50	@	6.75
New Light Oxfords	3.25	@	3.50
New Light Prints	2.75	@	3.00

Old Rags

No. 1 White Linens	7.50	@	8.00
No. 2 White Linens	6.50	@	7.00
No. 3 White Linens	4.50	@	5.00
No. 4 White Linens	2.25	@	2.50
No. 1 White Cotton	4.25	@	4.75
No. 2 White Cotton	3.25	@	3.75
No. 3 White Cotton	2.50	@	2.75
No. 4 White Cotton	1.90	@	2.15
Extra Light Prints	2.00	@	2.25
Ord. Light Prints	1.75	@	1.85
Med. Light Prints	1.55	@	1.65
Dutch Blue Cottons	1.75	@	1.85
French Blue Linens	2.30	@	2.40
German Blue Linens	2.15	@	2.25
German Blue Cottons	1.70	@	1.80
Checks and Blues	1.30	@	1.40
Linsey Garments	1.95	@	2.05
Dark Cottons	1.50	@	1.60
Old Shopperies	1.00	@	1.05
New Shopperies	.95	@	1.05
French Blues	1.70	@	1.80

Old Rope and Bagging

(Prices to Mill f. o. b. N. Y.)

Gunny No. 1—			
Foreign	1.70	@	1.80
Domestic	1.50	@	1.60
Wool Tares, light	1.65	@	1.70
Wool Tares, heavy	1.75	@	1.80
Bright Bagging	1.65	@	1.70
Manila Rope—			
Foreign	1.85	@	2.00
Domestic	1.75	@	2.00
Small Mixed Rope	1.10	@	1.35
New Burlap Cut	2.00	@	2.25
Hessian Jute Threads—			
Foreign	2.60	@	2.75
Domestic	2.80	@	3.00

Old Waste Papers

(F. o. b. New York)

Shavings—			
White Envelope Cuttings	2.45	@	2.55
Ordinary Hard White No. 1	2.10	@	2.15
Hard White No. 2	1.90	@	2.00
Soft White No. 1	1.70	@	1.80
Flat Stock—			
Stitchless	.65	@	.75
Over issue Mag	.65	@	.75
Solid Flat Book	.55	@	.60
Crumpled No. 1	.35	@	.40
Solid Book Ledger	1.50	@	1.65
Ledger Stock	.75	@	.80
New B. B. Chips	.30	@	.35
Manilas—			
New Env. Cut	1.70	@	1.80
New Cuttings	1.35	@	1.45
Print	Nominal		
Bogus Wrapper	.40	@	.50
Container	Nominal		
Old Kraft Machine—			
Compressed bales	1.10	@	1.20
News—			
No. 1 White News	1.30	@	1.35
Strictly Overissue	.60	@	.65
Strictly Folded	.35	@	.37½
No. 1 Mixed Paper	.27½	@	.30

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Twines
(F. o. b. Mill)

Coarse Polished—			
India	.12¼	@	.14¾
Belg. White Hemp	.13¼	@	.16¾
India Compress	.12¾	@	.13¾
Fine Polished—			
Fine India	.20	@	.22

CHICAGO

Paper
(F. o. b. Mill)

Rag Bond	.12	@	.50
Water Marked Sulphite Bond	.06¾	@	.11
Sulphite Bond	.05½	@	.11
Superfine Writing	.18	@	.24
No. 1 M. F. Book	.06½	@	.07¼
No. 2 M. F. Book	.05¼	@	.06¼
No. 1 S.&S.C. Book	.06¾	@	.07¾
No. 2 S.&S.C. Book	.05¾	@	.06½
Coated Book	.07	@	.12
Coated Label	.07	@	.08½
No. 1 Manila	.04¼	@	.05¾
No. 1 Fibre	.04¾	@	.05¾
No. 2 Manila	.04¼	@	.04¾
Butcher's Manila	.03¼	@	.03¾
No. 1 Kraft	4.75	@	5.00
Southern Kraft	3.88	@	4.25
No. 2 Kraft	3.88	@	4.25
Wood Tag Boards	.04¼	@	.06¼
Sulphite Screenings	.03	@	.03¼
Manila Tissue	.05¾	@	.07
White Tissue	.07	@	.09

(Delivered Central Territory)

News, per ton—			
Rolls, contract	41.00	@	—
Sheets, open	46.00	@	48.50
Boards, per ton—			
Plain Chip	46.50	@	—
Solid News	50.00	@	—
Manila Lined Chip	55.00	@	—
Patent Coated	65.00	@	—
Container Lined—			
85 Test, per 1000 sq. ft.			1.70
100 Test, per 1000 sq. ft.			1.85

Old Papers
(F. o. b. Chicago)

Shavings—			
No. 1 White Envelope Cuttings	1.70	@	2.00
No. 1 Hard White	1.40	@	1.65
No. 1 Soft White	1.25	@	1.50
Ledger & Writings	.70	@	.80
Solid Books	.60	@	.70
Blanks	1.00	@	1.05
Krafts	.80	@	.90
New Kraft Cuts	1.20	@	1.30
Manila Env. Cuts	1.25	@	1.30
Ex. No. 1 Manila	.90	@	1.00
Print Manila	.40	@	.50
Overissue News	.40	@	.45
Old Newspapers—			
No. 1	.30	@	.35
No. 1 Mixed Paper	.25	@	.30
Roofing Stocks—			
No. 1	30.00	@	—
No. 2	28.00	@	—

PHILADELPHIA

Paper
(Delivered Philadelphia)

Bonds	.05-9/10	@	.38
Ledgers	.06-9/10	@	.40
Writings—			
Fine No. 3	.05	@	.06
Superfine	.10	@	.12
Extra Fine	.15	@	.26
Fine	.15	@	.26
Fine, No. 2	.10	@	.25
Book, M. F.	.05¼	@	.06¼
Book, S. S. & C.	.05½	@	.07½
Book, Coated	.06½	@	.09
Coated Lithograph	.06¾	@	.08½
Label	.07	@	.11
No. 1 Jute Manila	6.25	@	—
Manila Sul., No. 1	5.25	@	—
Manila No. 2	3.75	@	—
No. 1 Kraft	5.00	@	—
Southern Kraft	4.75	@	—
Common Bogus	.03	@	—
News Print Rolls	40.00	@	—
Straw Board	40.00	@	45.00
News Board	40.00	@	—
Chip Board	37.50	@	—
Wood Pulp Board	70.00	@	85.00
Binder Boards—			
No. 1, per ton	75.00	@	80.00
No. 2, per ton	70.00	@	75.00
Carload lots	65.00	@	70.00
Tarred Felts—			
Regular	52.25	@	54.25
Slaters (per roll)	.84	@	.94
Best Tarred, 1-ply (per roll)	1.95	@	2.10
Best Tarred, 2-ply (per roll)	1.40	@	1.75
Best Tarred, 3 ply	2.00	@	2.25

Domestic Rags (New)
(Price to Mill, f. o. b. Phila.)

Shirt Cuttings—			
New White, No. 1	.03½	@	.04
New White, No. 2	.02½	@	.04
Light Silesias	.02½	@	.03
Silesias, No. 1	.03	@	.03½
Black Silesias, soft	.02½	@	.03
New Unbleached	.05	@	.05½
Washable, No. 1	.01½	@	.02
Blue Overall	.03½	@	.04
Cottons—According to grades—			
Washable, No. 2	.02½	@	.03
New Blue	.01½	@	.03
Fancy	.01½	@	.03
New Black Soft	.02	@	.04
New Light Seconds	.01½	@	.02
New Dark Seconds	1.50	@	1.75
Special	.18	@	.20
B. C.	.26½	@	.28½
Unpolished—			
Box	.11	@	.11½
Paper Makers	.08	@	.13
Tube Rope	.09	@	.14½
Wall Paper	.10	@	.13½
Wrapping	.13½	@	.19½
Special	.13½	@	.14
Soft Fiber Rope	.11¼	@	.11¾
Khaki Cuttings—			
No. 1 O. D.	.03	@	.04
No. 2 Mixed	.03	@	.04
Corduroy	.02	@	.03
New Canvas	.03½	@	.04½
New Black Mixed	.02½	@	.03½

Domestic Rags (Old)

White No. 1—			
Repacked	2.50	@	3.50
Miscellaneous	1.75	@	2.25
M. G.	3.00	@	3.75
Thirds and Blues—			
Miscellaneous	1.00	@	1.50
Repacked	1.50	@	2.00
Black Stockings (Export)	2.00	@	3.50
Roofing Stock—			
Foreign No. 1	.50	@	.75
Repacked	.70	@	.85

Bagging
(F. o. b. Phila.)

Gunny, No. 1—			
Foreign	1.25	@	1.50
Domestic	1.50	@	1.75
Manila Rope	2.00	@	2.25
Sisal Rope	1.25	@	1.50
Mixed Rope	1.00	@	1.10
Scrap Burlaps—			
No. 1	1.25	@	1.50
No. 2	.80	@	1.00
Wool Tares, heavy	2.75	@	—
Mixed Strings	1.15	@	1.25
No. 1 New Light Burlap	2.25	@	2.50
New Burlap Cuttings	2.00	@	2.25

Old Papers
(F. o. b. Phila.)

Shavings—			
No. 1 Hard White	2.25	@	2.30
No. 2 Hard White	1.90	@	2.00
No. 1 Soft White	1.80	@	1.85
No. 2 Soft White	1.25	@	1.30
No. 1 Mixed	—	@	.75
Solid Ledger Stock	1.50	@	1.60
Writing Paper	1.00	@	1.10
No. 1 Books, heavy	.55	@	.60
No. 1 New Manila	1.50	@	—
Print Manila	.50	@	.60
Container Manila	—	@	.50
Old Kraft	1.00	@	—
No. 1 Mixed Paper	—	@	.30
Straw Board Chip	.40	@	—
Binders Board Chip	.40	@	—
Corrugated Board	.55	@	—
Overissue News	.60	@	—
Old Newspapers	.40	@	—

BOSTON

Paper
(F. o. b. Mill)

Ledgers—			
Sulphite	.06	@	.12½
Rag Content	.12	@	.30
All Rag	.36	@	.52½
Bonds—			
Sulphite	.07¼	@	.11
Rag Content	.12	@	.30
All Rag	.36	@	.65
Writings	.06½	@	.20
Superfines	.11	@	.31
Book, Super	.06	@	.09
Book, M. F.	.05½	@	.08½
Book, Coated	.08½	@	.18
Coated Litho	.09	@	.12
Label	.09½	@	.15
Jute Manila No. 1	.11	@	.13
Manila, Sul. No. 1	.04¼	@	.06¼
Manila, Sul. No. 2	.03¾	@	.04½
No. 1 Kraft	.04¾	@	.05
No. 2 Kraft	.04½	@	.04¾
(F. o. b. Boston)			
Southern Kraft	.03¾	@	.04½
(F. o. b. destination in carload lots, f. o. b. mill in less than carload lots)			
Common Bogus	.02	@	.02¾
(Delivered New England points)			
News Print Rolls	39.50	@	—
Straw Board, rolls	.009	—	@35.00
Straw Board in Sheets, basis 35s to 70s	—		@40.00
Filled News Board	40.00		@45.00
Chip Board	37.50		@40.00
Chip Board (Creasing)	37.50		@40.00
Single Manila Lined Chip	47.50		@52.50
Single White, Patent Coated News Board (Bender)	55.00		@65.00
Wood Pulp Board	70.00		@75.00
Binder Boards (Standard Grade)	67.00		@75.00

Old Papers
(F. o. b. Boston)

Shavings—			
No. 1 Hard White	2.00	@	2.20
No. 1 Soft White	1.75	@	1.90
No. 2 Mixed	.75	@	.80
Solid Ledger Books	1.40	@	1.50
Overissue Ledger Stock	1.15	@	1.30
Mixed Ledgers	.85	@	.90
No. 1 Books, heavy	.55	@	.65
No. 1 Books, light	.50	@	.60
Crumpled Stitchless Book Stock	.50	@	.60
Manila Env. Cuttings	1.30	@	1.40
No. 1 Old Manila	.60	@	.65
White Blank News	1.25	@	1.30
No. 1 Kraft	1.10	@	—
Mixed Papers	.27½	@	.30
Print Manila	.50	@	.60
Container Manilas	.27½	@	—
Old Newspapers	.27½	@	.30
Overissue News	—	@	.35
Box Board Chips	—	@	.25
Corrugated Boxes	.35	@	.37½
Screening Wrappers	.40	@	.45

Bagging
(F. o. b. Boston)

Manila Rope—			
Foreign	1.80	@	1.90
Domestic	1.50	@	1.75
Transmission Rope	.90	@	1.00
Jute Rope	1.50	@	1.60
Jute Carpet Threads	.65	@	.70
Gunny No. 1—			
Foreign	1.85	@	1.90
Domestic	1.50	@	—
Bleachery Burlap	4.00	@	4.50
Scrap Burlap—			
Foreign	1.85	@	1.90
Domestic	1.60	@	—
Scrap Sisal	1.30	@	1.35
Scrap Sisal for Shredding	1.35	@	1.50
Wool Tares, heavy	1.75	@	1.85
New Burlap Cuttings	1.75	@	1.90
Australian Wool Pouches	2.50	@	2.75
Heavy Baling Bagging	1.75	@	2.00
Paper Mill Bagging	1.25	@	—
Bagging No. 2	.90	@	.95

Domestic Rags (New)
(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints	.01¾	@	.02
New White No. 1	.06	@	.06½
New White No. 2	.04	@	.04¾
Silesias No. 1	.04½	@	—
New Black Silesias	.02½	@	.03
Soft Unbleached	.06½	@	.06¾
Blue Cheviot	—	@	4.65
Fancy	.0195	@	.021
Washable	.0165	@	.0170
Cottons—According to grades—			
Blue Overalls	.04½	@	.04¾
New Black, soft	.04	@	.04¾
Khaki Cuttings	.03½	@	.03¾
O. D. Khaki	.03	@	.03¼
Corduroy	.01¾	@	.02
New Canvas	—	@	.05
B.V.D. Cuttings	—	@	.06¾
Paper Mill Bagging	1.10	@	1.25

Domestic Rags (Old)
(F. o. b. Boston)

Canvas	.04½	@	—
White No. 1—			
Repacked	—	@	2.75
Miscellaneous	2.50	@	2.75
White No. 2—			
Repacked	1.90	@	2.00
Miscellaneous	2.00	@	2.25
Twos and Blues	1.50	@	2.00
Thirds and Blues—			
Repacked	1.37½	@	1.75
Miscellaneous	1.25	@	1.62½
Black Stockings	2.50	@	3.00
Roofing Stock—			
No. 1	1.50	@	1.60
No. 2	1.35	@	1.40
No. 3	1.05	@	1.15

Foreign Rags
(F. o. b. Boston)

Dark Cottons	1.55	@	1.60
New White Shirt Cuttings	5.50	@	6.00
Dutch Blues	2.25	@	2.50
New Checks & Blues	2.50	@	3.00
Old Fustians	1.90	@	—
Old Linsey Garments	2.10	@	—
New Silesias	4.75	@	—

TORONTO

Paper
(F. o. b. Mill)

Bond—			
No. 1 Sulphite	.11	@	—
No. 2 Sulphite	.08½	@	—
No. 1 Colored	.12	@	—
No. 2 Colored	.09	@	—
Ledgers (sulphite)—			
Ledgers, No. 1	.34½	@	—
Ledgers, No. 2	.25½	@	—
Writing	.09	@	.09½
Book—			
No. 1 M. F. (Carloads)	6.50	@	—
No. 2 M. F. (Carloads)	6.00	@	—
No. 3 M. F. (Carloads)	5.50	@	—
No. 1 S. C. (Carloads)	7.00	@	—
No. 2 S. C. (Carloads)	6.50	@	—
No. 3 S. C. (Carloads)	5.20	@	—
No. 1 Coated and Litho	12.00	@	—
No. 2 Coated and Litho	10.50	@	—
No. 3 Coated and Litho	9.50	@	—
Coated tinted	13.00	@	—
Wrapping—delivered—			
Rag Brown	4.75	@	—
White Wrap	3.50	@	—
"B" Manila	5.25	@	—
No. 1 Manila	5.40	@	—
Fiber	5.40	@	—
Kraft, M. F.	5.90	@	—
Kraft, No. 2	5.40	@	—
News, per ton—			
Rolls (contract)	39.50	@	—
Sheets	44.50	@	—

Pulp

Ground wood	27.00	@	—
Unbleached Sulphite	42.00	@	—
Book (Class 1)	58.00	@	—
Writing (Class 2)	59.00	@	—
Select (Class 3)	60.00	@	—

Old Waste Paper
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PAPER TRADE JOURNAL

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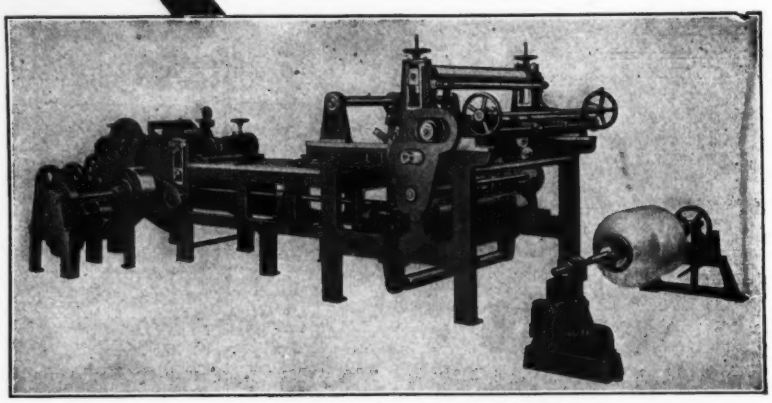

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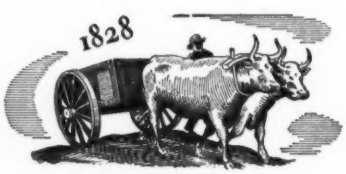

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